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FEBRUARY 1997

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The New Mac OS

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POWERTOWER PRO 225

VAILABLE, NONE YET MATCHES
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ACWORLD MAGAZINE DECEMBER '96
R'S CHOICE FOR BEST OFFICE SYSTEM

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— MACWORLD MAGAZINE JANUARY '97
SMALL OFFICE/HOME OFFICE/EDUCATION SYSTEM



POWERBASE 240

MacWeek **(respectively). MacUser Magazine also gave both PowerTower Pro and PowerBase unprecedented five mice ratings. Both machines garnered MacUser Eddy-Award nominations for best Mac OS System of the year. Unanimous endorsement like this doesn't come easily – unless you happen to make the best Mac OS systems on the planet.**

MacUser ZD LABS

PowerComputing

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OR SCHOOL – THE EDITORS OF MACWOR

"THE POWERTOWER PROS ARE CO
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EDITOR'S CHOICE FOR BES



POWERCENTER 150

"EVEN WITH ALL THE NEW MAC MODELS
THE POWERCENTER'S BALANCE OF PRICE,
—
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"POWERBASE OFFERS MORE VALU
LOW COST CHAMP!"
EDITOR'S CHOICE FOR BEST

With all the new Mac OS systems on the market, it's easy to get confused. Thankfully, the experts have sorted it all out for you. Macworld Magazine has awarded Power Computing the Editor's Choice awards for "Best Publishing and Design, Office, Small Office, Home Office and Education systems" to the PowerTower Pro, PowerCenter and PowerBase

Mac OS

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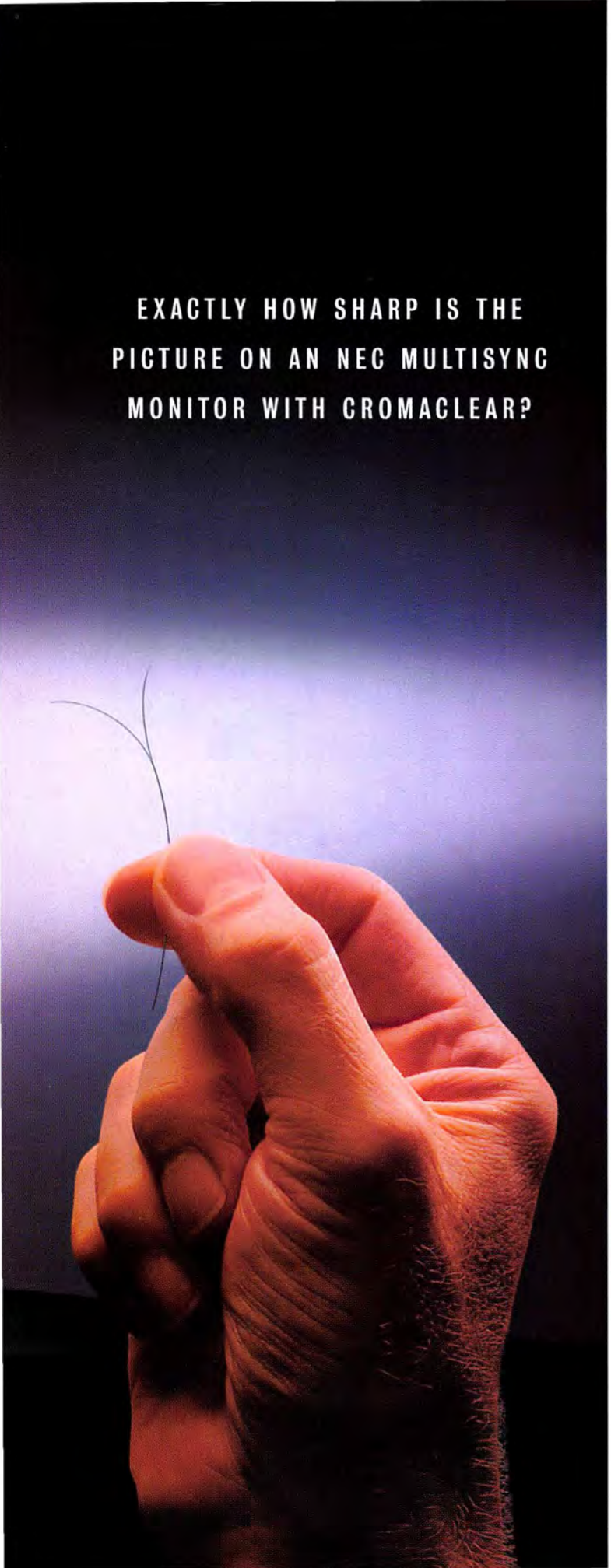
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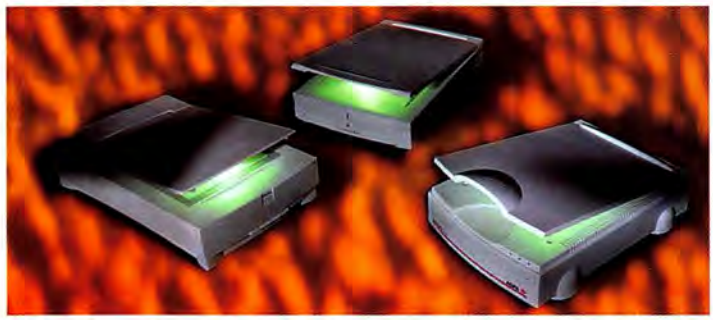
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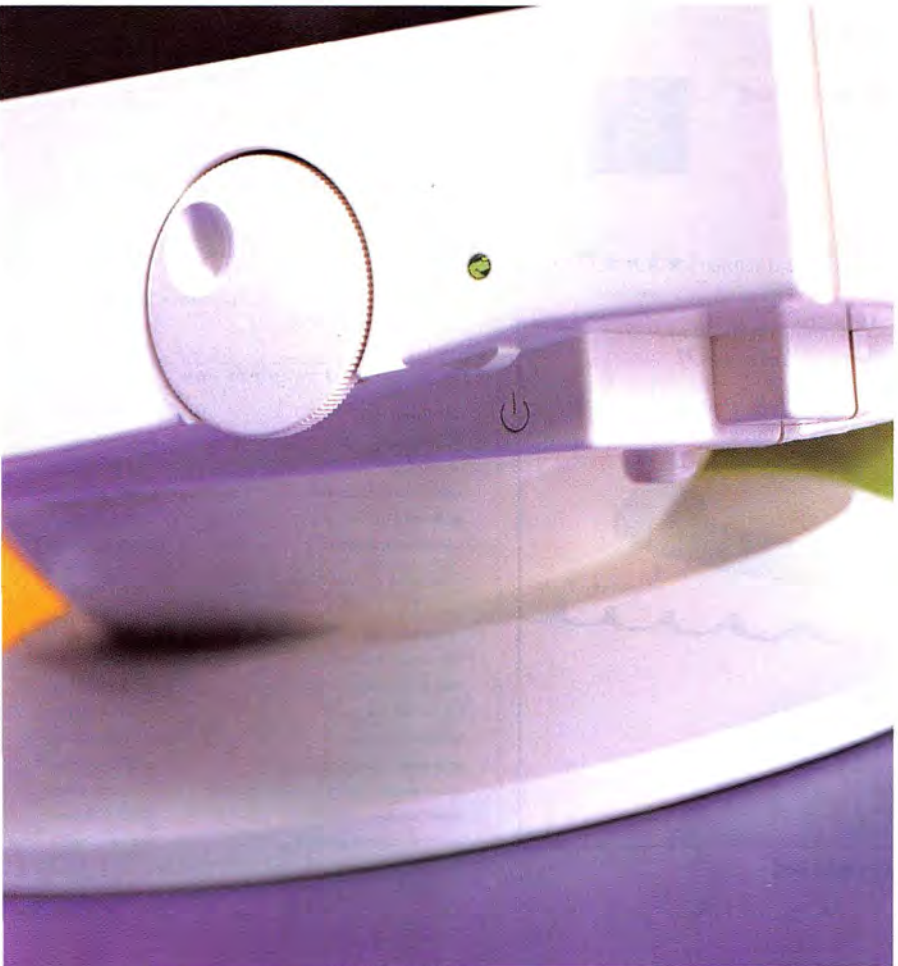
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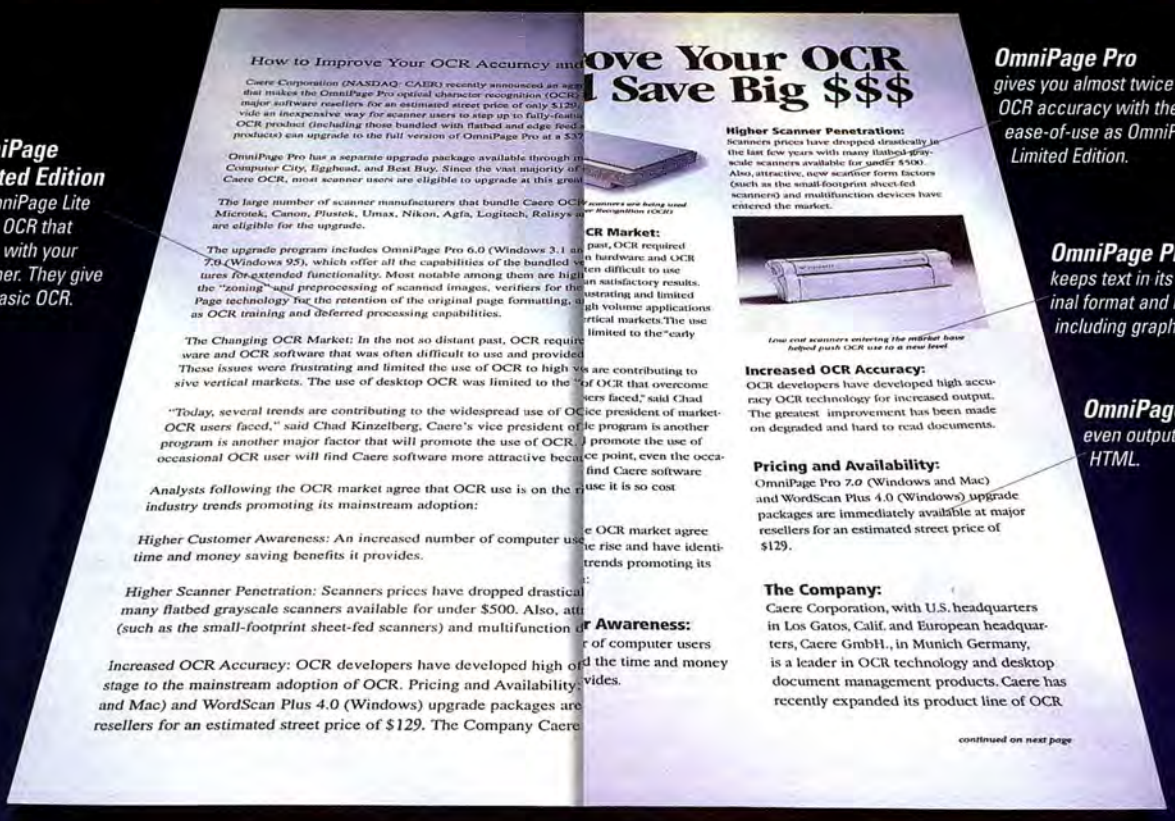
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even outputs to HTML.



How to Improve Your OCR Accuracy and Save Big $$$

Caere Corporation (NASDAQ: CAER) recently announced an agg... that makes the OmniPage Pro optical character recognition (OCR)... major software resellers for an estimated street price of only $129... vide an inexpensive way for scanner users to step up to fully-featu... OCR product (including those bundled with flatbed and edge feed... products) can upgrade to the full version of OmniPage Pro at a $3...

OmniPage Pro has a separate upgrade package available through... Computer City, Egghead, and Best Buy. Since the vast majority of... Caere OCR, most scanner users are eligible to upgrade at this grea...

The large number of scanner manufacturers that bundle Caere OCR... Microtek, Canon, Plustek, Umax, Nikon, Agfa, Logitech, Relisys a... are eligible for the upgrade.

The upgrade program includes OmniPage Pro 6.0 (Windows 3.1 an... 7.0 (Windows 95), which offer all the capabilities of the bundled v... tures for extended functionality. Most notable among them are high... the "zoning" and preprocessing of scanned images, verifiers for the... Page technology for the retention of the original page formatting, a... as OCR training and deferred processing capabilities.

The Changing OCR Market: In the not so distant past, OCR require... ware and OCR software that was often difficult to use and provided... These issues were frustrating and limited the use of OCR to high vo... sive vertical markets. The use of desktop OCR was limited to the "...

"Today, several trends are contributing to the widespread use of OC... OCR users faced," said Chad Kinzelberg, Caere's vice president of... program is another major factor that will promote the use of OCR... occasional OCR user will find Caere software more attractive becau...

Analysts following the OCR market agree that OCR use is on the ri... industry trends promoting its mainstream adoption:

Higher Customer Awareness: An increased number of computer use... time and money saving benefits it provides.

Higher Scanner Penetration: Scanners prices have dropped drastica... many flatbed grayscale scanners available for under $500. Also, att... (such as the small-footprint sheet-fed scanners) and multifunction d...

Increased OCR Accuracy: OCR developers have developed high o... stage to the mainstream adoption of OCR. Pricing and Availability... and Mac) and WordScan Plus 4.0 (Windows) upgrade packages are... resellers for an estimated street price of $129. The Company Caere...

ove Your OCR

Higher Scanner Penetration:
Scanners prices have dropped drastically in the last few years with many flatbed gray-scale scanners available for under $500. Also, attractive, new scanner form factors (such as the small-footprint sheet-fed scanners) and multifunction devices have entered the market.

low cost scanners entering the market have helped push OCR use to a new level

CR Market:
past, OCR required
n hardware and OCR
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n satisfactory results.
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are contributing to
of OCR that overcome
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ice president of market-
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e OCR market agree
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trends promoting its

r Awareness:
r of computer users
d the time and money
vides.

Increased OCR Accuracy:
OCR developers have developed high accuracy OCR technology for increased output. The greatest improvement has been made on degraded and hard to read documents.

Pricing and Availability:
OmniPage Pro 7.0 (Windows and Mac) and WordScan Plus 4.0 (Windows) upgrade packages are immediately available at major resellers for an estimated street price of $129.

The Company:
Caere Corporation, with U.S. headquarters in Los Gatos, Calif. and European headquarters, Caere GmbH., in Munich Germany, is a leader in OCR technology and desktop document management products. Caere has recently expanded its product line of OCR

continued on next page

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Retains original layout	✔	

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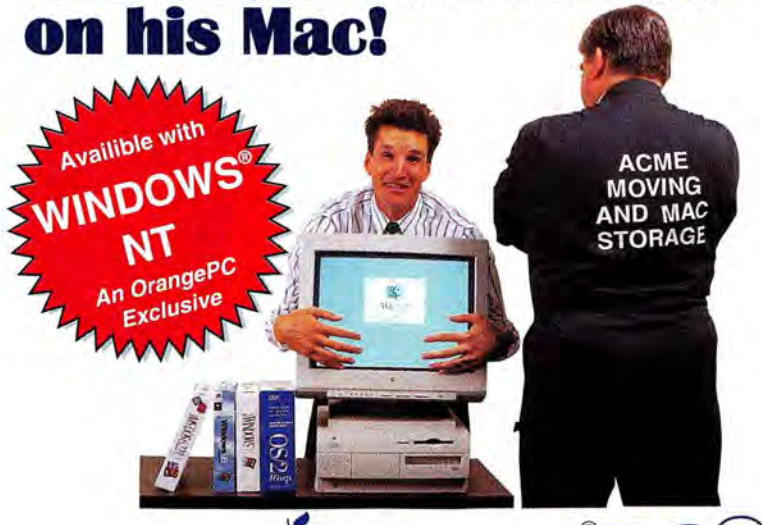
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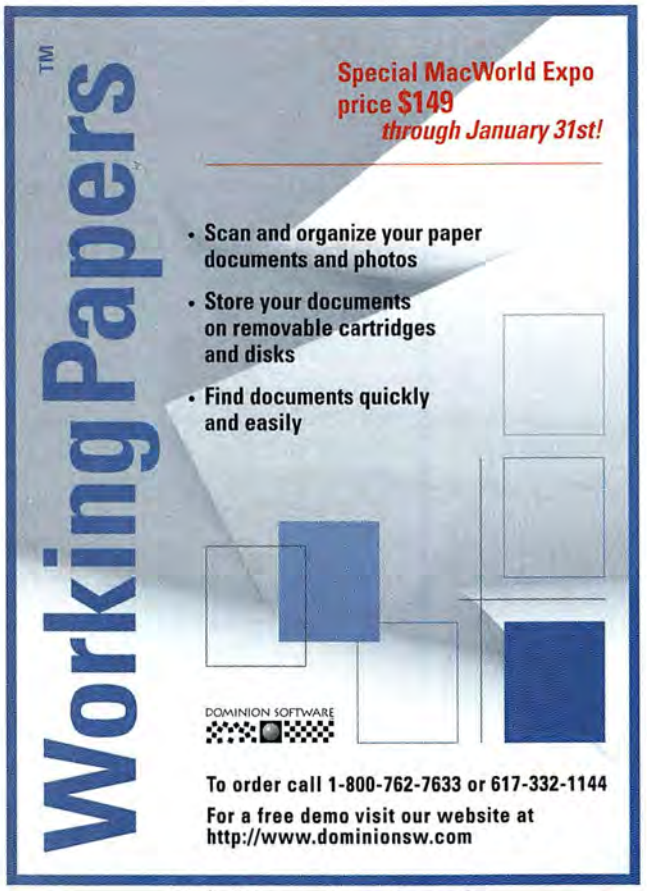
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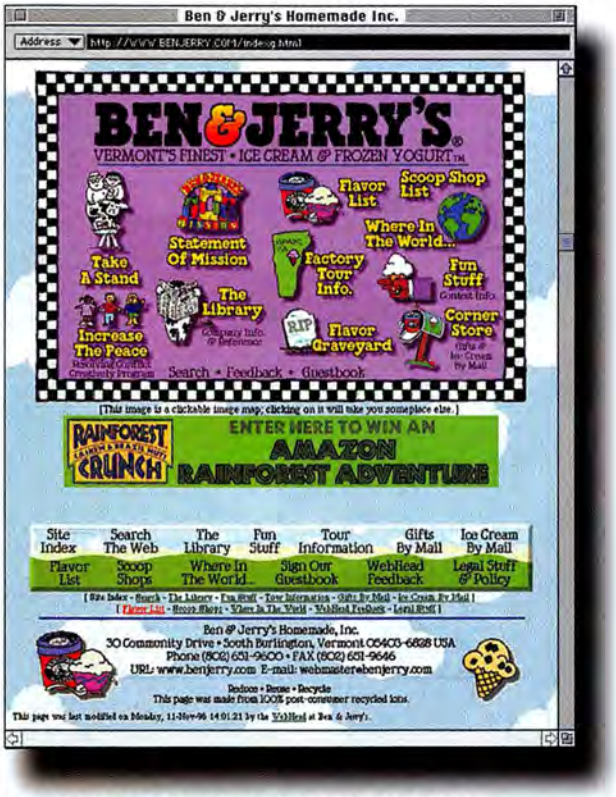
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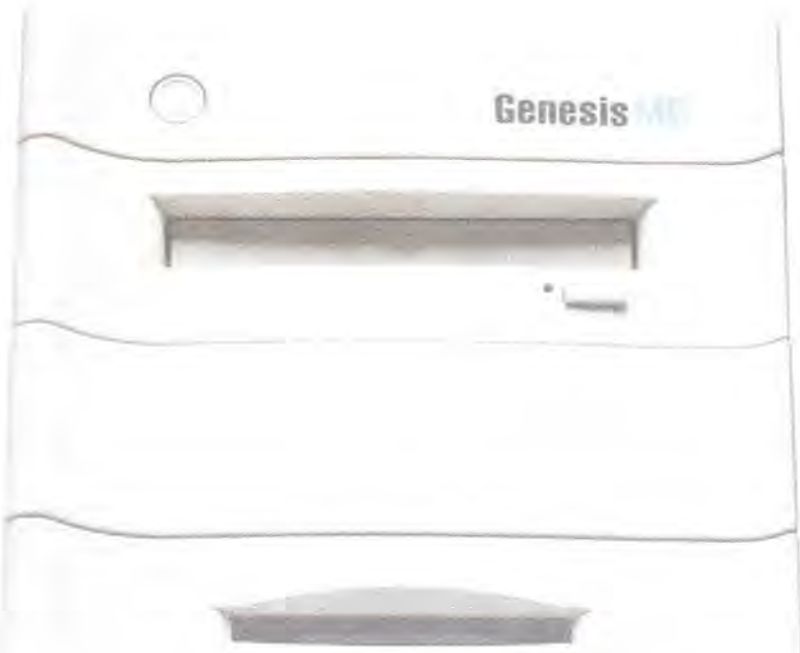
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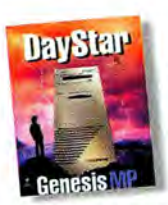


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FEBRUARY 1997

Letters

Versatile Voltage Award

I JUST READ YOUR REVIEW OF COLOR ink-jet printers (November 1996). Since I've been considering getting one, I was very pleased to see the Epson Stylus Color 500 get such a rave review. I intend to move back to New Zealand in about a year, so I'm looking for a dual-voltage printer. Most Apple products are dual-voltage, but it appears from the Stylus Color 500 spec sheet that the printer is limited to 110V. So I must ask, which is the best dual-voltage printer? Or just how hard would it be to put a dual-voltage power supply into a Stylus Color 500? I realize that you may not be able to answer the second question, but I figure if anybody can, it's you guys.

BART JANSSEN
Davis, California

The power supply you get with your printer will vary depending on what country you're in when you order it. Hewlett-Packard printers, for example, support voltages from 100 to 240 volts depending on the power supply installed (one per printer). According to Epson's ink-jet product manager, replacing the power supply on a $300 printer would be cost-prohibitive; you'd be better off buying the printer directly from a dealer Down Under.

Be sure to see "Color Ink-Jet Jewels" in this issue for more on ink-jet printers.—Ed.

Brave New Upgrade

THE NIGHT BEFORE I READ "BRAVE New Driver" (*News*, November 1996), I had looked in vain for *n*-up printing in the Print dialog box of LaserWriter 8.4. I think *n*-up printing is the bee's knees. That's why I decided to stick with a shareware-modified 8.3.4 driver.



JEFF NEUMANN

After reading the article, I went to the Print dialog box, chose Layout, and found what I was looking for. I now have a reason to upgrade. Thanks, *Macworld*.

CHRIS HULSE
via Macworld Online

IS MICROSOFT PROGRAMMING FOR Apple now? After reading "Brave New Driver" I wasted half an hour downloading LaserWriter 8.4. It has got to be the ugliest and most inefficient software I have ever seen from Apple.

Simpler and enhanced? You must be joking! Apple used to put all its printing options in two compact dialog boxes. Now, these options are spread out through no less than *nine* huge, mostly empty dialog boxes.

Sorry, Apple—all that extra mousing around isn't worth a marginal increase in speed and a few new features. I'm going back to version 8.3.3.

SCOTT KITTS
Willits, California

Exclusive News

THE NOVEMBER COVERS OF BOTH *Macworld* and *MacUser* proclaim "exclusive" previews of the new Motorola Macs. It used to be that *exclusive* meant you had information no one else had. Maybe now it means "this issue only"? I am sending this to *MacUser* and *Macworld exclusively*. Perhaps one of you will enlighten me as to the current definition of *exclusive*.

RANDY J. REIMER
Sullivan, Missouri

Motorola promised Macworld *an exclusive on its new systems, including access to a first-off-the-assembly-line machine and full details on price, features, and so forth. Motorola also approached* MacUser *about doing a technology preview story, where* MacUser *would be able to talk about an early version of the Motorola Macs but without substantive details. Had* Macworld *known that the information was not exclusive, we would have presented our story differently; we suspect* MacUser *would have too.—Ed.*

All Things Being ISO

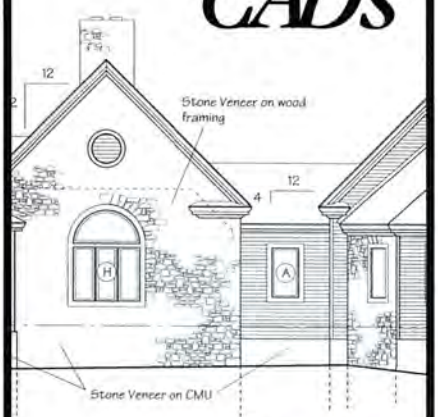
IN YOUR STORY "IS THERE LIFE AFTER JPEG?" (*News*, November 1996), Stephen Beale identifies the ISO as the International Standards Organization. The correct name is the International Organization for Standardization. "Oh!" you exclaim. "How can this be?" Well, ISO is not really an acronym. ISO is derived from the Greek word *isos*, meaning "equal." So we say "ice-o," not "I-S-O."

BRIAN HART
Glen Burnie, Maryland

*Well, what do you know? ISO Online (*http://www.iso.ch/welcome.html*) says, "From*

continues

DRAW
circles around those other CADs



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—Bob Payne, Architect



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CORRECTIONS

- *Topographic maps are published by the U.S. Geological Survey, not the U.S. Geographic Survey ("Map Factory," Reviews, November 1996).*
- *The phone number for STF Technologies is 816/463-1412 ("Your Mac Is Ringing," November 1996).*
- *The correct bus speed for the PowerTower 180 is 60MHz ("The Vast Mac Expanse," December 1996).*

equal to standard, *the line of thinking that led to the choice of 'ISO' as the name of the organization is easy to follow."—Ed.*

A Digitally Enhanced Reunion

I WAS HAPPY TO SEE YOUR REVIEW OF telephone directories on CD-ROM (*Reviews*, November 1996) and to see that you gave the edge to Pro CD's Select Phone. I had an extremely rewarding experience last year using Pro CD's product.

I was one of six men who survived a military plane crash in Alaska in 1954. On February 5 of this year, armed with Select Phone, I started the process of locating the other five men, whom I had not seen for 42 years. Only one still lives in the area where he grew up, but what would have been a really difficult task a few years ago was a relatively simple one today. We had a reunion last summer in Dayton, where we had many questions that had long plagued us about the crash answered. Without Pro CD's Home Phone and Select Phone, our reunion probably would not have taken place.

RUPERT PRATT
Scotia, New York

Media Watch

I WAS AMUSED TO READ IN "THE BEST Media Machine" (November 1996) that there are no MIDI synthesis cards available for Macs, when I use one every day. The MacWaveMaker (Morning Star Solutions, 508/692-0373) NuBus card uses the same chip set found in Kurzweil's wonderful and expensive professional-level synthesizers and has been favorably reviewed in musicians' trade journals. It is my impression that the sound quality of this Macintosh sound card is far superior to that of most PC sound cards. You can find out more about the MacWaveMaker online at the MacWaveMaker Users Group page, *http://members.tripod.com/~proclus/mw.html.*

MICHAEL LOVE
Waltham, Massachusetts

I stand corrected—thanks to orthopedic shoes. Alas, one NuBus-based MIDI card does not a healthy market make; the Macintosh world still remains well behind the Windows world when it comes to widespread availability of inexpensive MIDI sound cards that also support digital audio recording and playback—something MacWaveMaker doesn't support.—Jim Heid

I ENJOYED "THE BEST MEDIA MAchine," but I have one qualification: Jim Heid says "there are no software-only [audio] multitrack programs for Windows." There is an excellent software multitrack program called SAW for Windows (Innovative Quality Software, 702/433-5668, *http://www.iqsoft.com*) that works with most sound cards. If I were doing intensive audio work on a Windows-based machine, it would be my first choice.

MARK DUMAS
Thousand Oaks, California

SAW is indeed a fine program, but it isn't a software-only solution: as you point out, SAW requires a sound card. Programs such as Macromedia's Deck II work on a stock Mac. —Jim Heid

WITH RESPECT TO JIM HEID'S writing, which is of a very high standard (we even quote some of his best articles in our Mac-dedicated MIDI and audio site, the MMAP, at *http://www.euro.net/ecompany)*, I think this time he has left out an important piece of digital audio software, leading him to a second-best conclusion. Macromedia's Deck 2.5.2 is a professional recording, editing, mixing, and postproduction digital audio package, with which we produce all audio in our studios. We never had the urge to purchase a Windows machine and hook it up to a network with our Macs to do the severe editing that—according to Jim—can be done only on the Windows platform. I hope Jim will correct this small mistake and continue the good work he otherwise always does.

PETER J. BLOEMENDAAL
Duiven, Netherlands

continues

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Deck II, a Macworld *1995 World Class award winner, is a terrific multitrack recording program. But it isn't a waveform editor. A larger selection of waveform editors, such as Sonic Foundry's awesome Sound Forge, is available for Windows. Regarding the use of my articles on your Web site: can you say* copyright violation?*—Jim Heid*

Ahem. For more information on copyright and the Net, see "Copyright and the Visual Arts," October 1996, and NetSmart, *June 1996.—Ed.*

I'M AN AVID USER OF ADOBE AFTER Effects and I thought I'd collected just about every plug-in and filter that has been made for use with this beautiful program. That was until I came across the illustration in "The Best Media Machine." There, pictured alongside that famous 1984 footage, is the Effect Controls window for a filter called AgedFilm. Of the multitude of useless filters available, this is one that I truly need and want. Who makes it and how do I get it?

CORRIE GORSON
via Macworld Online

AgedFilm is part of a collection of plug-ins called Aurorix (DigiEffects, 415/563-4318, http://www.digieffects.com*). Watch for the review in an upcoming issue.—Ed.*

Mac Devotions

THIS LETTER IS FROM ONE OF YOUR most devoted readers. I've never felt the need to complain or seek further assistance after reading one of your thought-provoking articles. But after reading your review of Dramatica Writer's Dream Kit 1.7 in the August 1996 issue, I began to ponder the following quote: "Nonetheless, Dream Kit blows away the competition in price and power. Most writer-assistance software is $300 or more."

However, I have no idea what the competition is! I live in a city in New York that has one of the highest per capita concentrations of Mac heads in the United States. However, due to the few "Microsofts" that live in this town, we do not have a top-quality Mac store anywhere in sight. The "sons of Bill Gates" that do carry Mac products have them in a small closet in the back of the store. When I ask these "AOLs" if they have any writer-assistance software for the almighty Mac, they give me this "MS Word 6" face as if to say, You're in DOS land, buy a clue! What is a Mac man to do with all these "C> prompts" and "DOS heads" around?

MATTHEW HUGYECZ
via Macworld Online

Sorry; didn't mean to be such an "auto.exe.bat." Some of the other screenplay-related programs for the Mac are StoryVision (StoryVision, 310/392-5090), Final Draft 4.0 (B.C. Software, 310/636-4711, http://www.bcsoftware.com*), and Dramatica Pro 2.0 (Screenplay Systems, 818/843-6557). Also, check out Scriptdude on the Web:* http://members.aol.com/thunder69/scriptdude.*—Ed.*

FORGIVE ME, FOR I HAVE SINNED. I lost data by not backing up. My Visioneer PaperPort's software tells me that I cannot fax using PaperPort because I don't have GlobalFax addresses. And after backing up, this is true. My best guess is that I should reinstall my GlobalFax software. Am I right or wrong? And if I'm right, do I need to uninstall GlobalFax manually first? Can you point me to a place in the manual that will tell me about the procedure? If not, can you let me know yourself?

DON TEWS
via Macworld Online

Yeah, right—like I read my GlobalFax manual. I personally would just reinstall GlobalFax Addresses from the disk. But since I also personally believe Liberace is alive and well and hovering above Las Vegas in a yellow UFO, I checked with Global Village's technical-support staff. They recommended doing the same.

They weren't sure about Liberace.—Ed.

A Hot Question

MOTOROLA'S HOT NEW MACS" (November 1996) states that the Apple Power Mac 7200 and the Power Computing PowerTower Pro use the Catalyst design, while the Power Mac 9500 and the PowerTower use the Tsunami design. Is this correct? I've read elsewhere that the PowerTower Pro uses the Tsunami, not the Catalyst, design.

JULIAN WAN
Buffalo, New York

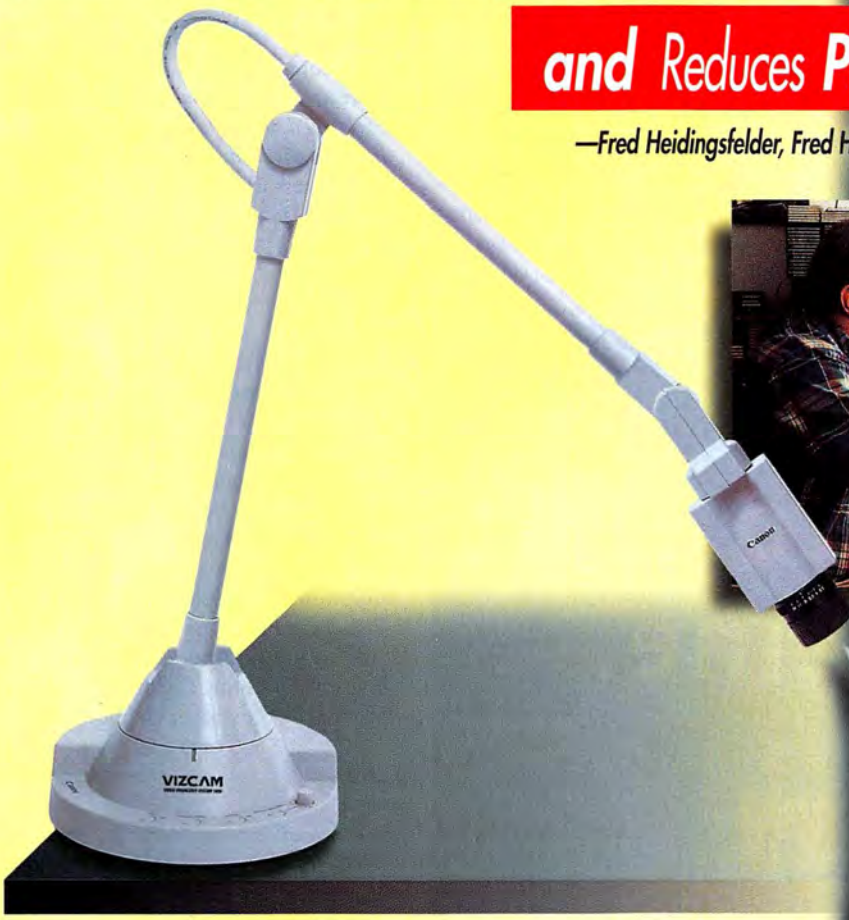
The fact that Apple uses the Catalyst design for its low-end Power Macs while Power Computing uses it for some its high-end Macs confuses a lot of people—even us, in a previous article. But "Motorola's Hot New Macs" had it right: the

continues

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—Fred Heidingsfelder, Fred Heidingsfelder & Associates, Pittsburgh, PA.





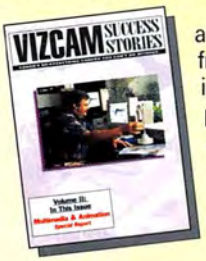
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Power Mac 7200 and the PowerTower Pro use the Catalyst design, and the Power Mac 9500 and the PowerTower are Tsunami-based.—Ed.

Electronic Photo Albums

LIKE MANY PEOPLE, I HAVE A LAG OF about three years between getting photographs developed and putting them in an album. I've been searching the Internet without success for an application I can use like an electronic photo album. I'd like to be able to catalog the photos, view them, both individually and in a slide show, and preview them as thumbnails. Can you point me in the right direction?

ALAN DEAN
Houston, Texas

I can think of three off the top of my head. ProView 1.3 ($99.95; E-magine, 212/665-0030, http://www.e-magine.com; *demo available) got a four-star review in* Macworld*'s November issue. There's also PictureAlbum ($99.95; Media Minds, 619/453-3133,* http://www.mediaminds.com; *demo available) and PhotoMate ($99; Connectix, 415/571-5100,* http://www.connectix.com*). Or go the shareware route and try Judy Bara's $10 Photo Album Plus (you'll need FileMaker Pro 3.0 to use it). It's available from Macworld Online (*http://www.macworld.com*) or America Online (keyword* Macworld*).—Ed.*



StoolieWare

IN "KEEP YOUR HANDS OFF MY MAC" (*Secrets*, November 1996) Joseph Schorr describes two rather tedious methods for hiding files: making them invisible or making them unopenable. Both of these operations may be done much more easily with the shareware control panel Snitch. Snitch expands the display and function of the Get Info command. It shows the File Type and Creator in editable windows. And you can make a file invisible by simply clicking a box in a display of the file's other characteristics.

B. JEFFERSON LE BLANC
Santa Cruz, California

*Readers can download Snitch 2.1 ($20, Mitch Jones) from Macworld Online (*http://www.macworld.com*) or from America Online (keyword Macworld).—Ed.*

Hope Yet for Old Dogs

ALAN APPLEGATE CAN SOLVE HIS PROBlem with getting his students to stop using double spaces (*Letters*, November 1996) by installing Maurice Volaski's $15 shareware utility SmartKeys 3.1 (*http://www.fluxsoft.com*). After 50 years of double-spacing, these old fingers learned the new trick in a matter of days.

IRVING SILVER
Ottawma, Ontario, Canada

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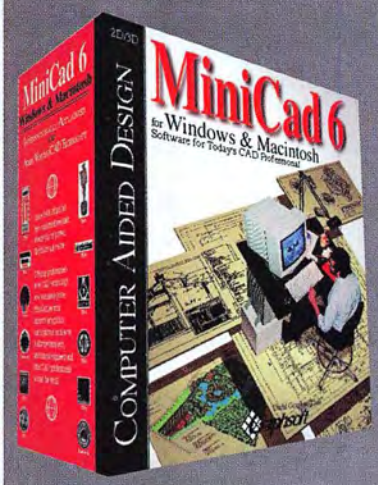
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State of the Mac

by Adrian Mello

The Mac's New Operating System

A FIVE-POINT PLAN TO MEASURE APPLE'S SUCCESS

THERE'S BEEN A LOT OF excitement about Apple's possible adoption of the Be operating system. It's an interesting story (see our analysis, "Time for a New OS?" elsewhere in this issue), but it's just part of a much bigger picture confronting the Mac. Apple must now act decisively to clarify the muddied waters of the Macintosh Operating System and strike out in a direction that reinvigorates the Mac platform.

This will be the first major test of the ability of CEO Gilbert Amelio and his new executive team to craft Apple's technology agenda. The success of this effort is crucial to Apple's survival and to all of us who prefer the Macintosh way of computing. I've outlined a five-point plan to help you put Apple's OS plans in perspective and judge whether it's on the road to success in the coming months.

1. Offer a Clear Plan

Sometime shortly after you read this, Apple will announce its system software road map. Whether the Be OS plays the key role is less important than that Apple provide a clear and convincing destination. It was painful last summer to see Copland unravel so quickly after we were told of its promise for years. The good news was that it signaled a new honesty and sobriety at Apple about engineering efforts. The bad news was that Copland's cancellation left customers and developers in limbo. Developers didn't know what to plan for, and customers continued to worry about the Mac's future. That can't happen again.

2. Improve Performance

The Mac OS is showing its age in two areas. First, it doesn't have the high-performance features like multitasking, multithreading, and protected memory that demanding users require. Many of these applications are traditional strongholds for the Mac, where it often enjoys a market share of 60 percent or more. There is a danger that some users will migrate to Microsoft's Windows NT because it has high-performance features missing in the Mac OS. Any new Mac OS must provide clear performance advantages.

Second, the Mac OS is not as reliable as it once was because of an increasing number of system extensions and patches. Ordinary users need reliability more than they need performance. After all, any definition of ease-of-use should include being free of the constant intrusion of bugs, hangs, and crashes. Any new OS must improve the Mac's reliability.



HANK OSUNA

3. Set a Tight Deadline

Time is of the essence. Apple must field an improved OS within a year. This is an almost unthinkably tight window for OS development, but I believe it's necessary to reinvigorate the Mac. It's unfortunate that so much time was lost developing Copland, but hopefully some of that work can be salvaged to contribute to the next Mac OS. Meeting a tight deadline will mean that Apple will have to make many difficult decisions, such as overcoming the not-invented-here syndrome.

4. Keep Compatibility in Balance

Backward compatibility is a double-edged sword and must be handled carefully. On one hand, few users are likely to embrace a new OS that immediately obsoletes their applications software, and developers require widespread adoption before committing resources to a new platform. On the other hand, the quest for compatibility can add tremendous engineering complexity that wastes time and resources (witness Copland).

Ideally, Apple must pursue a strategy that lets customers adopt the new OS gradually while the company conserves engineering resources and time. Of course, this is easier said than done. My hope is that Apple can repeat the well-managed transition from 68000-family processors to the PowerPC. But Apple can't maintain compatibility at all costs—the mistake it made with Copland. If it must err, it must do so on the side of bold new technology.

5. Herald the Benefits

A successful transition to a capable new Mac OS will be a tremendous accomplishment. But Apple must go further and make its accomplishments meaningful to customers and the media alike. Any major new Mac OS must create a strong argument about why the Mac is distinctly superior to the alternatives. Apple should identify those benefits and work hard to make its case.

I'm convinced that if Apple can accomplish what I've laid out in these five points, it will be more successful than ever. Tell me what you think by dropping me a line at *mello@macworld.com*. m

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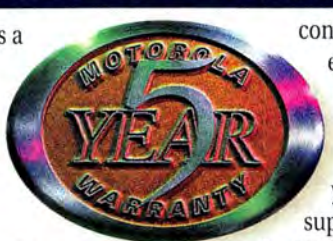
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$1599.

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- Internal 1.2 GB Hard Drive
- Internal 8X CD-ROM Drive
- 256K Level 2 Cache
- 1 MB VRAM [Exp. to 4MB]
- Supports 14", 15", 17" or 21" Monitors, VGA and SVGA Displays
- Stereo 16-Bit Sound I/O
- External 28.8Kbps Fax/Modem
- 3 PCI Expansion Slots
- Two ext. drive bays, 1 internal
- Five-Year Manufacturer's Warranty
- Extended Keyboard and Mouse



$1999.

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Monitor sold separately.

MOTOROLA STARMAX 3000 MAC OS MINI TOWER

180MHz PowerPC 603e Processor
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- Internal 8X CD-ROM Drive
- 256K Level 2 Cache
- 1 MB VRAM [Exp. to 4MB]
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- Five-Year Manufacturer's Warranty
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- Stereo 16-Bit Sound I/O
- External 28.8Kbps Fax/Modem
- 5 PCI Expansion Slots
- Three ext. drive bays, Two internal
- Five-Year Manufacturer's Warranty
- Extended Keyboard and Mouse



$2799.

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MOTOROLA STARMAX 4000 MAC OS DESKTOP

160MHz PowerPC 604e Processor
- 16 MB RAM [Exp. to 160MB]
- Internal 1.2 GB Hard Drive
- Internal 8X CD-ROM Drive
- 512K Level 2 Cache
- 2 MB VRAM [Exp. to 4MB]
- Supports 14", 15", 17" or 21" Monitors, VGA and SVGA Displays
- Stereo 16-Bit Sound I/O
- 3 PCI Expansion Slots
- Two ext. drive bays, 1 internal
- Five-Year Manufacturer's Warranty
- Extended Keyboard and Mouse



$2299.

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MOTOROLA STARMAX 4000 MAC OS DESKTOP

200MHz PowerPC 604e Processor
- 16 MB RAM [Exp. to 160MB]
- Internal 1.2 GB Hard Drive
- Internal 8X CD-ROM Drive
- 512K Level 2 Cache
- 2 MB VRAM [Exp. to 4MB]
- Supports 14", 15", 17" or 21" Monitors, VGA and SVGA Displays
- Stereo 16-Bit Sound I/O
- 3 PCI Expansion Slots
- Two ext. drive bays, 1 internal
- Five-Year Manufacturer's Warranty
- Extended Keyboard and Mouse



$2999.

Ask for item CPU 0453

Monitor sold separately.

MOTOROLA STARMAX 4000 MAC OS MINI TOWER

160MHz PowerPC 604e Processor
- 32 MB RAM [Exp. to 160MB]
- Internal 2.5 GB Hard Drive
- Internal 8X CD-ROM Drive
- 512K Level 2 Cache
- 2 MB VRAM [Exp. to 4MB]
- Supports 14", 15", 17" or 21" Monitors, VGA and SVGA Displays
- Stereo 16-Bit Sound I/O
- 5 PCI Expansion Slots
- Three ext. drive bays, Two internal
- Five-Year Manufacturer's Warranty
- Extended Keyboard and Mouse



$2899.

Ask for item CPU 0452

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MOTOROLA STARMAX 4000 MAC OS MINI TOWER

200MHz PowerPC 604e Processor
- 32 MB RAM [Exp. to 160MB]
- Internal 2.5 GB Hard Drive
- Internal 8X CD-ROM Drive
- 512K Level 2 Cache
- 2 MB VRAM [Exp. to 4MB]
- Supports 14", 15", 17" or 21" Monitors, VGA and SVGA Displays
- Stereo 16-Bit Sound I/O
- 5 PCI Expansion Slots
- Three ext. drive bays, Two internal
- Five-Year Manufacturer's Warranty
- Extended Keyboard and Mouse



$3199.

Ask for item CPU 0454

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News

systems

Is the MMX Pentium a Threat?

MACWORLD LAB TESTS SHOW IMPROVEMENT OVER OLD PC'S

by Tova Fliegel with Jim Feeley



CHRIS LENSCH

By all appearances, Intel's MMX Pentium, the P55C, should be one fierce CPU. Set for an official release of January 8, MMX has already made impressive appearances at trade shows, breathing fire into demos of applications performing image processing, MPEG video, and audio. When *Macworld* saw a 200MHz MMX machine demonstrated at a high-end users' conference in front of a predominantly Mac-based audience, we wondered (as we scraped our jaws off the floor) about this chip's implications for the Macintosh platform, with its stronghold in traditional graphics and multimedia.

In that demo, MMX flew past a 200MHz Pentium Pro–based PC running complex 3-D animations in real time. But how would the technology perform under real-world conditions and how does it rate compared to the PowerPC CPU, already a ferocious multimedia performer? Has PowerPC finally met its match? Macworld Lab set out to find the answers.

Although our tests are preliminary, to be followed by a more extensive cross-platform analysis later this year, the results provide a first look at the systems' relative performance (see the benchmark "Has PowerPC Met Its Multimedia Match?"). While MMX appears to be a significant improvement for the Pentium, our assessment is that the PowerPC can still hold its own.

What Is MMX? Originally an acronym for matrix-multiplication extensions, but changed by Intel to mean multimedia extensions, MMX is a new breed of Pentium processor optimized for applications that multiply and accumulate operations. It also excels at performing highly parallel and computation-intensive tasks. Essentially, MMX uses an enhanced 80x86 instruction set, called single-instruction multiple-data (SIMD), that allows multiple bytes of data to be packed onto one register on a chip and processed in parallel. According to Intel, the programs that will see the biggest

boost from this approach are image processing, 3-D video and graphics, and audio.

To retain compatibility with existing operating systems, Intel decided against adding new registers to the MMX Pentium, deciding instead to spread MMX and floating-point operations across the same registers. As a result, while executing MMX instructions the Pentium cannot perform floating-point calculations, making MMX best suited to integer-based applications, which do not require a math coprocessor, and to applications that don't switch frequently between integer-based and floating-point functions.

Most programs today rely on integer calculations, so this disabling of the Pentium's floating-point capabilities while MMX operations are processed shouldn't degrade program performance. In fact, whether or not they use floating-point calculations, programs must be rewritten to take advantage of MMX directly or via a software interface revved for MMX, such as Microsoft's Direct 3D. Expect it to be a

continues on page 46

systems

The Mac Hits 300MHz

POWER COMPUTING SHOWS OFF A PROTOTYPE SYSTEM

by Galen Gruman

Faster and faster—that's the promise of PowerPC, and it's a promise that's being kept. Power Computing has shown a "technology concept" system running a 300MHz PowerPC 603e CPU, and you can expect to see real systems using the newest PowerPC chip by April and probably earlier. Neither IBM nor Motorola has yet announced a 300MHz 603e CPU.

Close Call Macworld Lab tests on an unoptimized Power Computing prototype (see the benchmark "A Glimpse Ahead: 300MHz Power Mac") show that the 300MHz 603e comes close in performance to 200MHz and 225MHz 604e systems. In some tests (not shown), it even beat them.

While the Power Computing prototype had a lower overall score than the PowerTower Pro, keep in mind that on the prototype 300MHz system, the disk, video, and I/O subsystem were not optimized to run with the new PowerPC.

Power Computing would most likely replace these components with faster ones to gain stronger overall performance—that's what the company did when it shipped the PowerBase series in late October. Although based on the same motherboard design as Apple's Performa 6400, the PowerBase systems ran faster, megahertz for megahertz, because Power Computing optimized the video and disk systems. Expect the same optimization for a shipping 300MHz system.

Faster Bus One optimization that Power Computing has already made in its technology-demo 300MHz system is the use of a 60MHz bus. Power Computing is the only Mac vendor to have a bus speed of more than 50MHz. To get this faster bus speed, Power Computing uses the Catalyst motherboard from Apple's Power Macintosh 7200. Although that motherboard was designed by Apple to run at up to 60MHz, Apple runs it no faster than 40MHz in its 7200, which uses a 120MHz PowerPC 601.



SUZANNE ROADY

A version of the 300MHz technology-demo system from Power Computing could ship this spring for $2500.

Because the fastest 603e's clock speed now surpasses that of the fastest 604e, you can expect to see 603e-based business systems from Power Computing and other Mac makers—Power Computing could easily sell a 300MHz PowerCenter business tower for $2500, compared with the $5000 cost of its 225MHz PowerTower Pro. The PowerTower Pro gives you more expansion slots and drive bays, but for most people the Pro's expansion level would not be worth a $2500 premium.

Don't think 300MHz is the end of the line for the 603e. Engineers at Motorola and other companies expect faster versions of the CPU to be developed later in 1997. And then there's the Exponential PowerPC X704, which can run as fast as 533MHz—Motorola has shown a prototype Mac system running this CPU, although no unit was available for Macworld Lab to test.

MW LAB

A Glimpse Ahead: 300MHz Power Mac

The prototype system from Power Computing running a PowerPC 603e CPU at 300MHz shows the potential of future Power Macs. If Power Computing were to deliver a system with a 300MHz PowerPC 603e along with optimized system components, it should run as fast as—or faster than—today's fastest Macs, yet cost less.

Longer bars are better. Results are times as fast as a Centris 650 (Centris 650 = 1.0). Products are listed from fastest overall to slowest overall, by company. Italic indicates the 300MHz prototype system.

	Overall Score	CPU-Intensive	FPU-Intensive	Disk-Intensive
Power Computing				
PowerTower Pro 225 (604e)	9.2	9.4	13.4	3.5
PowerTower Pro 200 (604e)	8.5	8.4	12.7	3.5
300MHz 603e prototype	8.2	8.2	12.2	2.9
PowerTower Pro 180 (604e)	7.8	7.9	11.3	3.4
PowerBase 240 (603e)	6.4	6.5	9.1	2.5
Apple				
Power Macintosh 9500/200 (604e)	7.7	7.5	12.1	2.9
Power Macintosh 8500/180 (604e)	6.7	6.6	10.3	2.4
Power Macintosh 7600/132 (604)	5.0	5.1	6.9	2.5

Behind Our Tests

For details on Macworld Lab's system tests, see *Mac Superguide*, January 1997.—**Macworld Lab testing supervised by Mark Hurlow**

networking

A Ping to Die For

OVERSIZE PACKETS CRASH MACS AND OTHER SYSTEMS

by Mel Beckman

Last November, Internet users discovered yet another way that hackers can attack their networks. Nicknamed the Ping o' Death, this new attack takes advantage of flaws in TCP/IP implementations on a wide range of systems, including desktop computers, file servers, routers, and other network devices. (A ping is a diagnostic tool whereby a machine sends a packet to another machine, and the recipient machine sends a ping back.) A TCP/IP ping packet larger than 65536 bytes causes susceptible machines to crash, hang, or reboot.

Attackers Can Stay Hidden Macs won't normally generate oversize pings, which exceed the official maximum IP packet size. But bugs in a few operating systems (including Windows 95 and NT) let their users generate such pings with ease. Death pings can attack any vulnerable machine on the Internet, from anywhere in the world. Sophisticated attackers can obscure their IP addresses to hide their identity.

Chris Moser, Web-site manager for Southland Micro Systems, tested several versions of TCP/IP on Macs and PCs, and found that even one killer ping can set a Mac to crash the next time the user tries to do anything with the machine—either remotely or locally. Early reports that MacTCP is immune to attack were premature. *Macworld*'s own tests found that systems running MacTCP also succumb when flooded with a series of ten or so pings, as long as MacTCP is first activated by running at least one TCP/IP application. In an interesting Kevorkian twist, Windows NT 4.0 machines crash after *sending* the illicit packets.

Apple's Network Server systems, which run IBM's AIX 4.1.4 Unix operating system rather than the Mac OS, are also vulnerable, as is MkLinux, Apple's port of the Linux version of Unix. An AIX patch available from IBM to fix the ping problem won't work on the Apple-hosted version of AIX. A/UX, an older and now defunct Apple Unix, is immune.

No Fixes from Apple Yet As a temporary solution, users may be able to program their Internet routers to block inbound pings, which has the unfortunate side effect of making unrelated network problems more difficult to diagnose. The only permanent solution to the ping problem is to install OS patches for each vulnerable system—something that nearly every other computer manufacturer has done already. Apple says it is working on such patches for both Open Transport and MacTCP, and will post them online at *http://www.apple.com*. But at press time, Apple had no information about fixes for AIX or MkLinux.

For a list of vulnerable systems and available patches, refer to Mike Bremford's Ping o' Death Web page at *http://www.sophist.demon.co.uk/ping/*.



KEVIN CANDLAND

ASK LCD Projector Uses DLP Technology

ASK LCD (201/896-8888) may have to change its name with the introduction of the Impression 8300, its first projector based on Texas Instruments' digital light processing technology, an alternative to the LCD technology used in most panels and projectors. The technology's core is the Digital Micromirror Device, a semiconductor light switch that offers precise control over the reflection of light used to generate digital images. Priced at $10,995, the projector features a maximum resolution of 1152 by 870 pixels. At SVGA resolution of 800 by 600 pixels it can display up to 16.7 million colors. It weighs 21 pounds and includes a cordless trackball with backlit keys for operation in the dark.—STEPHEN BEALE

multimedia

Apple Revs QuickTime VR

NEW NAVIGATION OPTIONS, PLUG-INS HIGHLIGHT NEW VERSION

by Jim Heid

After a slow start, Apple's QuickTime VR virtual reality technology is picking up steam and heading to where the action is. QuickTime VR 2.0, due to ship in January 1997, adds new features that promise enhanced VR experiences and make it easier for developers to add QuickTime VR support to their wares. Separately, new versions of the QuickTime browser plug-in deliver faster QuickTime VR downloads and offer Web developers enticing new options.

Panning and Zooming Support In QuickTime VR 2.0, object movies support panning and zooming, capabilities previously available only in panoramic movies. (Object movies enable users to rotate and examine objects.) Also new: object movies can appear within QuickTime VR panoramics, as can QuickDraw 3D sprites, conventional QuickTime movies, and still images.

The upgrade addresses the ears as well as the eyes with support for directional sound. If you're navigating a virtual jazz club and the bandstand is to your left, you hear music coming from your left-hand speaker. However, your authoring tool must be upgraded to support this feature.

QuickTime VR 2.0 also improves performance and playback reliability on Windows 95 and NT. And developers of 3-D graphics software can use a newly published programming

interface to add the ability to create QuickTime VR objects and panoramics.

Plug-in Improvements Many of QuickTime VR 2.0's enhancements won't surface until developers and content authors adapt their software and their titles or sites—which won't happen overnight. But the new QuickTime browser plug-ins (available at *http://quicktime.apple.com*) deliver immediate gratification that goes beyond QuickTime VR content.

QuickTime Plug-In 1.1, due to ship in mid-December 1996 at Internet World, supports Netscape Navigator 2.X and Microsoft Internet Explorer 2.1. The plug-in also adds playback support for AIFF audio files. When Apple ships its MPEG extension for QuickTime (due in early 1997), the Mac version of the plug-in will handle software-only MPEG movie playback.

QuickTime Plug-In 1.1 will also add support for URL hot spots to QuickTime VR panoramics, enabling the latter to become site-navigation devices. In a panoramic of a college campus, for instance, each building could be a hot spot that links visitors to the appropriate department.

In early 1997, Apple plans to ship version 1.2 of the plug-in, which will progressively download QuickTime VR movies; rather than waiting



while an entire movie downloads, a Web surfer will see and be able to navigate a low-resolution version as the rest of the movie downloads. However, you'll have to redo your existing QuickTime VR movies to support this feature—a fairly straightforward process.

Apple's efforts have been inspired in part by an onslaught of competing VR technologies: Omniview's PhotoBubbles (*http://www.omniview.com*), RealSpace's RealVR (*http://www.rlspace.com*), Black Diamond's Surround Video (*http://www.bdiamond.com*), and Net VR's Turnado (*http://www.netvr.com*).

Each competitor has its strengths, but most are in the development stages. By being first on the virtual block and by working to keep a step ahead, Apple has made QuickTime VR the premier technology for photographic VR.

JOHN BLECK

online

A FedEx for the Internet

TUMBLEWEED PREVIEWS NEW DISTRIBUTION TECHNOLOGY

by Galen Gruman

The Web is great for posting information, but you can't always be sure the right people actually get the information you send. So Tumbleweed Software (415/369-6790, *http://www.tumbleweed.com*) has created Posta, a database-driven server-and-client service that lets you use the Internet to distribute information in various forms to the readers you want. Posta should eliminate the problem of your mail enclosures' being garbled or stripped out by a recipient's mail system.

Expected to be available by April, Posta can deliver files to anyone by e-mail, Web pages, or fax. The Posta system, which runs on Windows NT and Unix workstations using Oracle or Microsoft SQL

continues

Systems WATCH

BY GALEN GRUMAN

CHRP Moves Ahead

While everyone waits for a version of System 7 that will run on the Common Hardware Reference Platform (CHRP) standard jointly designed by Apple, IBM, and Motorola for PowerPC-based Macs and PCs, the CHRP specification continues to evolve. CHRP version 1.1 should be final by July and include support for the Universal Serial Bus (USB) and IEEE 1394 (Firewire) buses. USB is Intel's answer to the Mac's ADB, while Firewire is a faster form of SCSI that Apple is promoting. By the end of 1997, the CHRP specification will again be updated, this time to define a standard for notebooks.

The latest estimates from Apple and other Mac makers are that the Mac OS for CHRP will be ready this spring, and Windows NT 4.0 for CHRP should be available at about the same time. Not all CHRP-based Macs will run NT, but expect each Mac maker to offer some models that run both OSs.

When the Mac OS for CHRP arrives, so will three motherboard designs based on the CHRP 1.0 specification: IBM's Long Trail, Motorola Computer Group's Viper, and Motorola RISC Group's Yellowknife. Apple is also working on a CHRP-based motherboard for its future Macs.

Umax, Motorola Add to Lines

Expected by January 1997 are new systems from Umax (510/226-6886, *http://www.supermac.com*) and Motorola (800/759-1107, *http://www.mot.com/computer/*).

Umax has announced the SuperMac S900/200DP, a dual-processor 200MHz 604e-based tower that costs $4705. However, its previously announced S900/180DP version has yet to ship, despite a planned ship date of mid-October. Also originally planned for mid-October but not yet shipping is the SuperMac C500/140, although Umax has finally released its C600 series and J700 (see *Mac Superguide*, in this issue).

Motorola has announced 3 additions to its StarMax line, which now includes 11 models: the $1595, 3000 DT603e-180 desktop; $1895, 3000 MT603e-180 tower; and $2795, 3000 MT603e-240 desktop. These new systems should ship by January 1997. The previously announced 8 StarMax models are now available.

Tatung Gets Mac License

Taiwan's Tatung, a major maker of PCs under other companies' names, has signed a deal with IBM to buy PowerPC chips and Mac OS licenses so it can begin building its own Mac clones. At Comdex, a Tatung representative told *Macworld* that the company will offer CHRP systems worldwide beginning in March or April 1997. A preliminary spec sheet lists systems with 603e and 604e CPUs, the latter running up to 233MHz.

Media WATCH

BY CATHY ABES

Can Digital Watermarking Protect You?

The proliferation of images on the Internet has brought a new dimension to an old problem: how to protect your work from would-be thieves. Many content creators and publishers are looking to digital watermarking, or fingerprinting, which embeds an imperceptible mark throughout an image that survives most editing transformations, scanning, and printing.

Several such products are available, but probably the most well-known is PictureMarc from Digimarc (503/223-0118, *http://www.digimarc.com*), recently licensed to Adobe for inclusion with Photoshop 4.0.

The watermark contains an assigned creator ID number and links to your profile page on Digimarc's online locator service, MarcCentre, which offers contact information such as e-mail and mailing addresses. In the first quarter of 1997, Digimarc plans to offer a version of PictureMarc geared to the needs of large-scale image distributors; its features will include the ability to embed an image ID in the watermark.



For a limited time, individuals can subscribe to MarcCentre for an annual fee of $79; the cost thereafter will be $150. Group subscriptions will be available to professional organizations, trade associations, agencies, and image libraries.

HighWater Signum (603/669-7466, *http://www.highwater.com/fbi.htm*) has developed a similar program that's available as either a Photoshop plug-in or a standalone application. It can embed both a creator and an image ID; you can register the creator ID through an automatic link to HighWater's Registry on the Web. For $75, you get the FBI Writer/Detector plug-in, a registry number, and a dongle that allows you to fingerprint 10,000 images.

The $1495 FBI Pro does batch fingerprinting and format conversions (including TIFF, Scitex CT, JPEG, EPS, and Mac to PC) and includes plug-ins for Netscape Navigator and Microsoft Internet Explorer. Use of the registry costs $150, which lets you fingerprint 50,000 images.

Many artists are enthusiastic about digital watermarking, but even proponents admit that it's not a panacea. Because it makes copyright information easily accessible, it will educate users ignorant of copyright issues and keep them from unintentionally misusing images. But it won't prevent determined thieves from stealing your work.

Server databases, acts as a server for Web pages created for specific users, and routes faxes and e-mail. Thus, a company could offer weekly price updates to customers, with each customer choosing the preferred delivery vehicle.

The Posta server can also query a system by installing a program that determines the system's capabilities, giving the Posta server the information necessary to choose the best delivery option. Other capabilities include support for private-key encryption (public-key encryption is also in the works for a later version), recipient certification, and expiration dates for delivered files. The company sees this as the online equivalent of guaranteed-delivery services like Federal Express.

Because Posta uses the Internet as the conduit for its transmissions, recipients can use any Web browser, Internet e-mail gateway, Internet printer (a networkable printer with a TCP/IP address), or fax machine to receive files. Web files can include embedded portable documents in Tumbleweed Envoy or Adobe Acrobat format. Tumbleweed will also distribute a free client program for Macintosh and PC users that lets them access delivered files without opening an e-mail client or a browser.

On the server side, users can determine whether files have been delivered and use a reporting tool to get information on the status of mailings.



Tumbleweed's new Posta electronic-delivery service lets you monitor your transmissions to find out if they were received.

Tumbleweed will provide Posta through Internet service providers and financial printing companies, as well as sell it to companies that want to install and manage their own Posta servers. Pricing has not been finalized but will include a monthly flat fee, plus per-message charges for most users, and site licenses for companies with their own servers.

publishing

Quark Updates Multimedia Software

QUARKIMMEDIA 1.1 TO SHIP THIS SPRING

by Barbara Assadi

Fresh on the heels of QuarkImmedia 1.0 (see "Quark Goes Interactive," elsewhere in this issue), Quark (303/894-8888, *http://www.quark.com*) is preparing an update of its multimedia authoring software, to be released this spring. Here is a partial list of features that Quark says will be part of version 1.1.

Custom (8-bit) Color Palettes for Each Page QuarkImmedia 1.1 will enable designers to enhance projects by using a separate 8-bit (256 colors) color palette on each page, so they can optimize graphic elements with a suitable color palette. QuarkImmedia 1.0 supports only one 8-bit palette per project, which means all graphical elements are mapped to the same palette.

Support for Photoshop Plug-Ins QuarkImmedia 1.1 will let you use Adobe Photoshop plug-ins with pixel editors (buttons, cursors, animations), as long as they're

continues

JOHN BLECK

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Enter data once into your Pilot or Macintosh. Then press the HotSync™ button to keep your Pilot and Macintosh up-to-date.

One touch automatically keeps the data on your Pilot safe and backed up on your Macintosh.



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pilot™
The one touch organizer

*The average U.S. street price for Pilot 1000, complete with all desktop PIM software and organizer software, docking cradle and accessories. Additional Mac Pac required at $14.95.

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US Robotics

among the 160 plug-ins that were available prior to the release of Photoshop 3.0.

E-mail Feature This feature lets you create an editable text box in which users can type e-mail and send it to a mail server.

Compatibility with Netscape Plug-Ins The QuarkImmedia viewer will be able to interact with Web sites developed with technologies such as Macromedia Shockwave or VRML (Virtual Reality Modeling Language), and the QuarkImmedia design tool will let users specify which plug-ins they want to access. At this time there are no plans for Java support.

Companion HTML Abstract for Search Engines Yahoo, Alta Vista, and other search tools find information by seeking the HTML header fields for specific Web pages. Since QuarkImmedia does not support HTML, these search engines can't find QuarkImmedia 1.0 projects. However, QuarkImmedia 1.1 will create an HTML document associated with the project. The user will be able to define the information included in this document.

Security Support Security Dynamics' encryption technology will be supported within the SSL (Secure Socket Layer) handshake protocol to accommodate electronic commerce.

Dynamic Clipping for QuickTime QuarkImmedia 1.1 will allow designers to place buttons and other objects on top of movies.



GIBSON

Friendly Faxing to Your Mac

Fax modems are great for sending facsimile transmissions, but receiving faxes can be a problem unless you keep your Mac turned on. Now there's the 3D FaxPal, a $169 peripheral from InfoImaging Technologies (510/485-4000, *http://www.infoimaging.com*) that lets you receive faxes—up to 20 pages' worth—even when your computer is powered down. You can also transmit faxes at 14.4 Kbps. Along with the 3D FaxPal, InfoImaging has developed a Macintosh version of 3D FaxFile, a $199 software package that converts files into a single-page fax consisting of black-and-white dots that can be decoded on the receiving end. The InfoImage technology can compress up to 110K of data.—STEPHEN BEALE

online

POP Goes the E-Mail

COMMERCIAL PROGRAMS RUSH TO SUPPORT INTERNET PROTOCOLS

by Elizabeth Dougherty

Amid the Internet's groundswell of popularity and the ripple-effect intranet frenzy, vendors such as Apple Computer, CE Software, StarNine, SoftArc, and Lotus Development are pumping support for Internet protocols, such as Post Office Protocol (POP), into a wave of new electronic-mail offerings.

Apple (408/996-1010, *http://www.apple.com*) has announced that it will support the Internet Mail Access Protocol (IMAP), a directory protocol that allows you to download messages more selectively than POP does, in future Mac OS Internet mail products.

Live Internet Links CE Software (515/221-1801, *http://www.cesoft.com*) has shifted its development efforts from its proprietary LAN-based system to the client side of Internet mail. Its newly released QuickMail Pro 1.0, a Mac and Windows POP3 client, features improvements, such as live Internet links, that will in time trickle down into the QuickMail LAN product. QuickMail Pro costs $70 for one user; multiuser licenses start at $280 for five users. QuickMail Express, a freeware version, can be downloaded from CE's Web site.

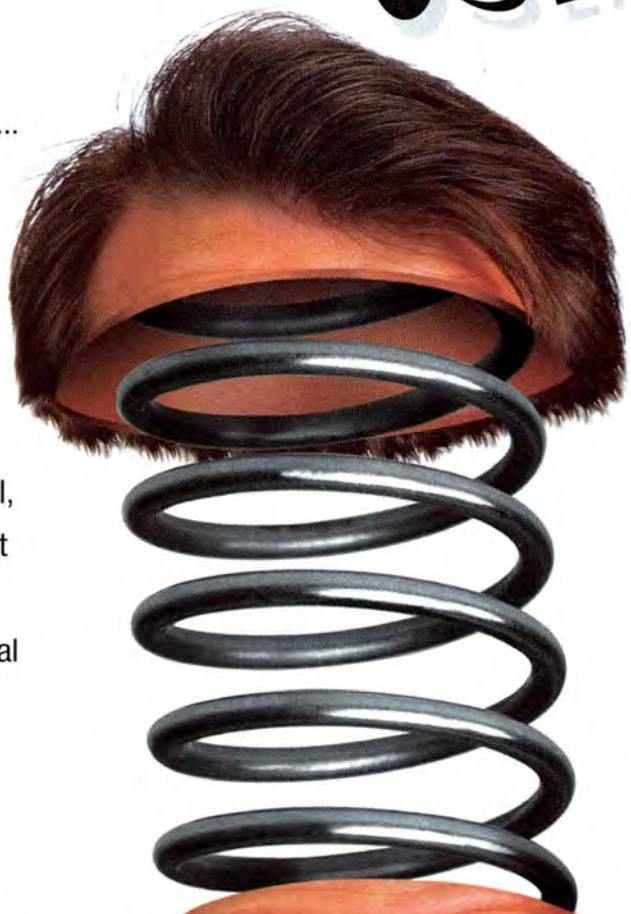
Better known initially for its mail gateways and now for its Web-server line, StarNine (510/649-4949, *http://www.starnine.com*), a division of Quarterdeck, has shipped Quarterdeck Mail 4.0, a long-awaited major upgrade to what was formerly Microsoft Mail for AppleTalk Networks. The new release features a revamped interface, easier access to the mail database, a rules engine, a spelling checker, a PowerPC-native server, and live Internet links. Remote users can now access their messages using a POP client. Quarterdeck Mail 4.0 costs $259 per server and $299 for ten clients.

Another long-awaited upgrade, FirstClass 4.0 from SoftArc (905/415-7000, *http://www.softarc.com*), is also now shipping. The newest version of this groupware and mail package lets users access information such as messages and conferences via Internet protocols (see "Flying FirstClass to the Net," *News, Macworld*, October 1996).

A More Open Approach In yet another departure from a proprietary approach, Lotus Development (617/577-8500, *http://www.lotus.com*) plans to add support for POP to the Notes 4.5 Domino server due out at the end of 1996, so that users can retrieve messages with a POP client. Notes 4.5 will also include additional Internet-access and content-creation software.

Rules engines, spelling checkers, styled text, and now Internet support are becoming de rigueur functions from commercial e-mail packages. However, to survive, the companies that have advanced these e-mail functions must now meet the Internet challenge. While competitors like Netscape Communications and Eudora would have you believe their mail offerings will replace their still-proprietary counterparts, both types of systems often exist in parallel, fulfilling different roles. Proprietary e-mail systems aren't immediately headed for extinction, but their long-term survival will depend heavily on their future Internet prowess.

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Special REPORT

The Compact Disc Hangs On

NEW FORMATS EXTEND CD CAPABILITIES

As we await the arrival of the 4.7GB digital versatile disc (DVD), developers are enhancing current compact disc technology with faster speeds and—finally—an erasable format. In this special report, we examine the benefits and pitfalls of next-generation CD formats.

Erasable CD Drives at Last

by Cary Lu

A new, erasable CD format—CD-RW—will appear in early 1997, bringing new storage capabilities along with numerous compatibility problems. The CD-R/RW (recordable/rewritable) drives should sell for $650, with CD-RW discs initially costing $25 and eventually dropping to between $5 and $15 each. The drive's cumbersome name reflects its ability to perform all CD-R functions, including writing to CD-R discs.

Compatibility Issues In the short term, CD-R discs (but not the drives) will have an enormous advantage over CD-RW discs: they'll be readable by nearly all CD-ROM drives. Because CD-RW discs have a new directory structure and changed reflectivity for the laser beam, only third-generation "Multi-Read" CD-ROM drives, due in early 1997, will be able to read them. (Similarly, early CD-ROM drives cannot read CD-R discs, but second-generation multisession or Photo CD–compatible drives can.)

Since rewritable drives will run at leisurely CD-ROM speeds, they won't replace magnetic hard drives for performance-critical applications, but CD-RW should become the main choice for short-term backups. However, the non-erasable CD-R discs will remain the best option for permanent archiving. And low-cost CD-R discs will still be an excellent distribution format for large files; in fact, they may always be cheaper than CD-RW discs.

DVD Ascending Looking further into the future, you can expect DVD to slowly replace the CD-ROM format, bringing with it even more compatibility problems. First,



the initial DVD-ROM drives will not read CD-R discs. Proposals for a new kind of CD-R disc (CD-R2) that could be read by a DVD-ROM drive have not yet been tested. Second, neither the DVD-R drives expected to appear in 1997 nor the DVD-RAM (DVD-RW) drives due about a year later will be able to write to CD-RW discs, although both should be able to read them. What's more, the first-generation DVD-ROM drives will not be able to read DVD-RAM discs, a format still in development. Of course, no CD drive will be able to read DVD discs, so anyone working with a variety of discs and drives will have to match disc formats to the ability of computers to read them. Adding to the confusion is the nearly identical appearance of all these discs. The industry missed a golden opportunity to specify standard markings (such as a color-coded ring in the center) to distinguish each format. It is trying to establish standard logos for each disc type, but the logos can be covered with labels.

DVD is an 8-centimeter (about 3-inch) mini-format. Although they're the same size as the failed 20-minute mini–audio CD and Sony Data Discman discs, mini-DVDs will have enough capacity to make them useful for portable computing devices. But a mini–DVD-ROM player will not accept a full-size CD or DVD.

Obvious Choice Since CD-RW is the obvious choice for now, CD-R drive sales should quickly plummet, although bargain hunters will probably find some enticing close-out deals.

Drive makers say they'll continue producing CD-R drives as long as there's a demand, which means they probably won't be around much longer. Consequently, we're not likely to see any second-generation CD-R drives that can read CD-RW discs.

The CD-RW format has been a long time coming—so long, in fact, that drive makers had planned to introduce compatible CD-ROM drives well in advance so millions of drives would be in place once the new discs arrived. For a while, some drive makers decided that DVD would make CD-RW obsolete before it even got off the ground. In the confusion, the final CD-RW standards were greatly delayed, which means we'll be sorting out compatibility problems for some time to come.

CD-ROM Speeds Soon to Pass 12× Limit

by Howard Baldwin

Just as with processors, CD-ROM drive speeds keep bumping skyward. Last year, 6× was hot stuff—now 12× is on the horizon from OEM manufacturers like Plextor (408/980-1838, *http://www.plextor.com*) and Toshiba (714/457-0777, *http://www.toshiba.com*). Even faster speeds are promised—but because speed boosts require new technologies, there are doubts as to whether the drives will be as fast as their labels indicate (based on our tests, there's also a question of whether higher speeds are worth the cost—see "CD-ROM Drives Accelerate," *Macworld*, December 1996).

continues

JOHN BLECK

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Circle 15 on reader service card



Beginning early this year, you'll see CD-ROM drives boasting speeds up to 16×; by midyear, you'll hear about drives boasting up to 20×. The key words are *up to.* Essentially, you'll hear about CD-ROM drives' upper limits, just as you currently hear about hard drives' burst transfer rate more than their sustained transfer rate.

CLV and CAV Currently, CD-ROM drives transfer data using a technology called constant linear velocity (CLV). This simply means that the transfer rate remains constant as the head moves from the inner tracks of the CD to the outer tracks; to accomplish this, the CD-ROM spins more slowly when the head is near the inner tracks, and faster when the head is near the outer tracks.

CD-ROM drives with speeds up to 20× will use constant angular velocity (CAV). Used by hard drives and magneto-optical drives, this technology does the opposite of CLV. Instead of maintaining a constant transfer rate, CAV maintains a constant spin rate. On inner tracks of CDs, for instance, the transfer rate might be as low as 10×; on outer tracks, the transfer rate might be as high as 20×.

An Interim Step The interim step between these two technologies—offering speeds between 8× and 16×—is known as PCAV (partial constant angular velocity), which represents an amalgam of the two. On inner tracks, the heads may move at a constant speed, but as they move toward the outer tracks, the spinning rate will increase.

The problem is that CDs are written from the inside out. If the CD is three-quarters full, and the CAV technology kicks in halfway through, you'll see higher speeds from only the remaining quarter of the CD's data. And you won't see the maximum rate, because that will come from reading the outermost tracks.

"The end user is going to be confused," says Tom W. Jones, director for support engineering at Toshiba. "The system-level OEMs are thinking of specifying a maximum transfer rate, but that'll never be what you're going to see."

Already confused by the possibilities of CD-ROM speed improvements? You can, if you so choose, hit the pause button and wait. By 1998, digital versatile disc (DVD) drives will start to make CD-ROMs obsolete—and they're based on CLV technology.

Panasonic Unveils 8× Portable Drive

by Stephen Beale

Panasonic (201/348-7000, *http://www.panasonic.com*) used the recent fall Comdex show to introduce what it claims to be the fastest "truly portable" CD-ROM drive on the market. The KXL-783M is an 8× drive that weighs 18.7 ounces without batteries.

Measuring 5.52 inches wide by 8.16 inches long by 1.4 inches high, the $500 drive offers 1200-KBps transfer rates, 180-millisecond access times, and 128K memory buffers. It connects to the PowerBook through a bundled SCSI-2 cable and can also be used with desktop Macs. It doubles as an audio CD player with built-in 3-D stereo speakers.

The KXL-783M is powered by six AA batteries, which provide 3 hours of data or 3.5 hours of audio. An AC adapter is also included, and Panasonic offers a rechargeable NiCd battery as an option.

Despite the emergence of the high-capacity DVD standard, Panasonic and other vendors don't see CD-ROM as a dead technology. "It has a good two years left," says John Gawa, manager of Panasonic's multimedia systems division. He cites the lack of DVD titles and manufacturing economies that will initially result in much higher prices for DVD technology.

Although Apple's new PowerBook 1400 can include a built-in CD-ROM drive, Gawa notes that the portable drive has one advantage—you can leave it at home.

CD Media Compatibility

MEDIA MAXIMUM CAPACITY	Audio CD 82 minutes	CD-ROM 650MB	CD-R 650MB	CD-R2 650MB	CD-RW 650MB	DVD-ROM 8.5GB [1]	DVD-R 3.8GB [2]	DVD-RAM 2.6GB [2]
DRIVE								
Audio CD player	read	○	○	○	○	○	○	○
Early CD-ROM	read	read	○	○	○	○	○	○
Multisession CD-ROM	read	read	read	read	○	○	○	○
MultiRead CD-ROM	read	read	read	read	read	○	○	○
CD-R	read	read	read/write	read/write	○ [3]	○	○	○
CD-R/RW	read	read	read/write	read/write	read/write	○	○	○ [4]
DVD-ROM	read	read	read	read	read	read	read	read
DVD-ROM/2 laser	read	read	read	read	read	read	read	read
DVD-R	read	read	read	read	read	read	read	read/write
DVD-RAM	read	read	read	read	read	read	read/write	read/write

JOHN BLECK

○ = Incompatible. [1] Single sided, two layers. [2] Single sided, one layer only. [3] A second-generation CD-R drive could read but not write CD-RW discs; it may never be built. [4] Second-generation DVD-ROM drives should be able to read DVD-RAM discs.

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Circle 11 on reader service card

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"IS THE MMX PENTIUM A THREAT?"

continued from page 35

while before you see MMX speedups on your friends' PCs.

Intel is marketing MMX to consumers rather than to content creators. But big players in the content-creation field—such as Adobe Systems (408/536-6000, *http://www.adobe.com*) and Macromedia (415/252-2000, *http://www.macromedia.com*)—are optimizing their software for MMX, and if MMX systems become wildly popular for playback, content users working on other platforms could be seriously disadvantaged.

The Proof Is in the Processor

Given Photoshop's position as a mainstay for Mac content creators, Macworld Lab made Adobe Photoshop 4.0 the cornerstone of our testing. Then we tested the speed at which an animation created in a late beta of Macromedia Extreme 3D 2.0 rendered to screen. Photoshop is optimized for MMX, as is Extreme 3D 2.0 via its support for the latest version of Direct 3D. Finally, in a subjective test, we asked *Macworld* staff to rank the quality of MPEG video on a scale of 1 to 5.

Since conventional wisdom dictates that there isn't a one-to-one speed correlation between a 200MHz Pentium PC and a 200MHz Mac, we performed our tests across a range of systems. We tested on two fast Macs, Apple's Power Macintosh 9500/200 and Power Mac 8500/180. Both use the PowerPC 604e CPU, which is faster than the plain 604 used in earlier Power Macs. We also tested on two MMX Pentium–based PCs, one a 200MHz system from a big-name PC maker that asked not to be identified, and the other a 166MHz system from CompuLink Research (954/450-7061, *http://www.clrusa.com*). We used as our baseline a



166MHz Pentium PC built by Macworld Lab around a standard Intel motherboard.

Macworld Lab's findings show that the MMX Pentium is indeed a tough multimedia competitor, and that the technology brings the Pentium to an entirely new level of multimedia performance. But don't trade in your Power Mac just yet. In Photoshop tests, the 200MHz MMX PC beat out the 200MHz Power Mac by less than 10 percent, and the PowerPC-based system still outshone the MMX in several key areas—proof that the 604e really is a state-of-the-art processor and evidence that the Pentium has been lacking in the past.

Keep in mind that all our tests were for operations optimized for MMX—non-MMX tests should show a greater PowerPC advantage.

In overall Photoshop testing, the 166MHz MMX Pentium PC showed a whopping 120-percent performance gain over the non-MMX 166MHz Pentium PC—that's more than twice as fast. The Power Mac 8500 running at 180MHz tied the 166MHz MMX Pentium PC for third, and the 200MHz MMX Pentium PC earned first-place standing, nearly tripling the performance of the 166MHz non-MMX PC.

The Power Mac 9500 wasn't far behind, however. It came in a close second to the 200MHz MMX Pentium PC, which was only 8 percent faster than the 9500.

continues

TriMedia: Separate but Better?

APPLE, PHILIPS TEAM TO OFFER A PROCESSOR-ONLY MULTIMEDIA SOLUTION

UNTIL THE PERFORMANCE AND MARKET-SHARE numbers are in, vendors designing a new generation of hardware—multimedia processors—are arguing the benefits of their respective implementations. Intel's MMX technology enhances a general-purpose processor to handle multimedia's computation-intensive tasks without overburdening the CPU. Meanwhile, Apple Computer is working with Philips Semiconductor, developers of the TriMedia chip, to improve multimedia performance on the Macintosh using a separate coprocessor working alongside the PowerPC.

Apple and Philips are billing TriMedia as a more elegant, efficient solution, saying that a general-purpose CPU does not have sufficient processing power for multimedia. TriMedia is a high-power digital signal processor (DSP) that performs multiple operations—audio, video, and MPEG decoding and encoding—in parallel. According to Apple, one of TriMedia's chief benefits is that developers write to the QuickTime Media Layer instead of to the DSP itself.

Although Apple has made no official announcements about its TriMedia implementation, reliable reports offer the following information. The chip will be used on two specialized PCI boards. A high-end board, code-named FireDrill, will include video and audio I/O and a FireWire (IEEE 1394) port. It will encode and decode digital formats including MPEG-1 and MPEG-2, Motion-JPEG, and CD-quality and Dolby AC-3 sound. FireDrill will include two 100MHz TriMedia chips and 8MB of synchronous DRAM. The second board, code-named South-by-Southwest, to be standard fare in some Mac models, will provide audio only and will include one 100MHz TriMedia chip and 4MB of DRAM. When sold as a separate add-on card, South-by-Southwest will reportedly cost $400 to $500, and the high-end FireDrill will be between $2000 and $3000. In contrast, MMX will be integrated into all new Pentium processors at prices very close to those of existing CPUs.

Apple has tried the DSP route before. Several Centris and Quadra models used a DSP from AT&T to speed up audiovisual processing, but Apple abandoned the technology when it migrated to the PowerPC. Still, the TriMedia DSP may have a place as a PowerPC partner, since today's digital-video technologies push the PowerPC to the limit. Also, if Apple later switches DSPs, the existing code will still work with a QuickTime-compatible successor to TriMedia. —TOVA FLIEGEL

CHRIS LENSCH

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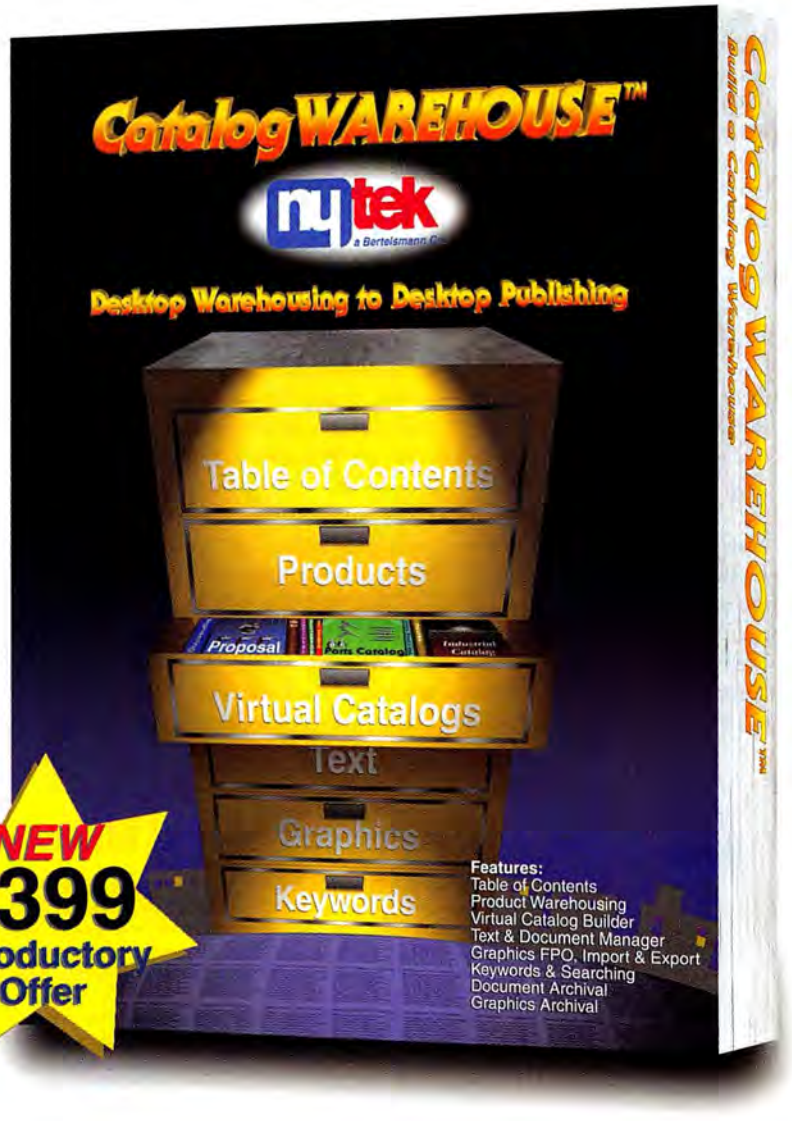
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Circle 19 on reader service card

A closer look at specific Photoshop functions reveals that the Power Mac 9500 was faster at some of Photoshop's more painterly functions—it came in first for tasks such as Find Edge and Median—while the 200MHz MMX Pentium PC rated first for filters used in production environments, including Blur, Blur More, and two of the three Gaussian Blurs we tested. When we averaged the results from all our tests, the 200MHz MMX Pentium PC rates only a few percentage points higher than the 9500 in both categories, which would probably not make a perceptible difference in performance for most users.

Using Extreme 3D, we created a 3-D model and timed how quickly it was rendered to screen. In this round the Power Macs took first and second place, but not by much. The Power Mac 9500/200 was the big winner, running at nearly twice the speed of the 166MHz non-MMX Pentium PC and 20 percent faster than the 200MHz MMX Pentium PC. In second place was the Power Mac 8500/180, which ran 60 percent faster than the slowest machine and 7 percent faster than the 200MHz MMX Pentium PC, which came in third. It is worth noting that again the MMX technology significantly increased performance on the PC side: of the two 166MHz PCs, the MMX-enhanced system performed 30 percent faster than the non-MMX system.



ARNOLD TIOSEJO

A tough competitor: the 166MHz MMX machine outran the non-MMX PC.

In our subjective tests of MPEG playback, the Power Mac 9500 edged out the 200MHz MMX Pentium PC. Staff members were asked to analyze three clips checking for fluid motion of frames, details of the display, frame dropouts, and sound synchronization. Most staffers gave the Power Mac 9500 and 8500 nearly equal ranking across the board, awarding them an average score of 3.8 and 3.6, respectively. The 200MHz MMX Pentium PC ranked very close to the top, also at 3.6. Keep in mind that these tests are subjective, and what looks like pixelation to one person may be unnoticeable to another unless the problems are pronounced.

Note that smooth MPEG playback on a PC, even one with an MMX Pentium, requires a modern video card. When Macworld Lab tested MPEG playback with a pre–Windows 95 video card, we got terrible performance. Intel says that MMX works hand-in-hand with the video card's own acceleration circuitry to get top playback quality, and the quality will vary from card to card.

The MMX Scream So, does Intel's MMX technology really scream? Well, it hollers. As the Macworld Lab testing shows, MMX goes a long way toward moving the Pentium platform forward, but it has yet to surpass the PowerPC definitively. And chip development for the Macintosh certainly isn't standing still:

• Exponential (408/441-6050, *http://www.exp.com*) just announced a chip that can plug into existing PowerPC machines and hit speeds up to 533MHz (see "PowerPC Aims for Higher Power," *News*, January 1997). Exponential's chip will cost about $1000 and is likely to run in machines that start at about $5000, aimed at graphics professionals.

• DayStar Digital (770/967-2077, *http://www.daystar.com*) is leading the way in multiprocessing with its Genesis MP systems, which boost performance in many of the areas that MMX does. Apple (408/996-1010, *http://www.apple.com*) and Umax Computer (510/226-6886, *http://www.supermac.com*) also use the DayStar technology in some models. Like MMX, multiprocessing requires a program to be rewritten to take advantage of the technology.

• Apple is working with Philips Semiconductors on its own solution, a multimedia coprocessor called TriMedia (see the sidebar, "TriMedia: Separate but Better?").

• Meanwhile, Motorola plans to unleash its next generation of PowerPC CPUs, the G3 and G4 series, later this year (see "Blindingly Fast Chips," *News*, November 1996).

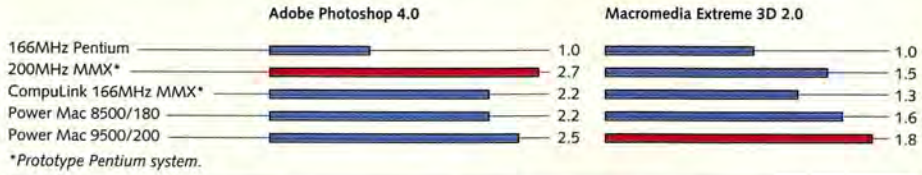
Intel does have one clear advantage over many of these solutions: price. The MMX Pentium should be priced about the same as today's Pentium Pros. So while the Mac platform may still be in step with Intel on multimedia, it might pay for Mac makers to consider the perspective that Intel CEO Andy Grove puts forth in his new book, *Only the Paranoid Survive*.

MW LAB

Has PowerPC Met Its Multimedia Match?

Intel's MMX Pentium is designed to handle multimedia and 2-D and 3-D graphics as never before. While our tests using Photoshop and Extreme 3D show that MMX significantly improves speed on the PC side, the Power Macs held their own. Keep in mind that our Power Macs had less VRAM than the two MMX-based PCs. Note that all results are for tasks accelerated by MMX technology and do not represent overall speed of either Macs or PCs.

Best result in test. Longer bars are better. Results are times as fast as a generic 166MHz Pentium-based PC (166MHz PC = 1.0). Products are listed alphabetically.



*Prototype Pentium system.

Behind Our Tests

Macworld Lab performed 25 tasks in Adobe Photoshop 4.0 (using 32MB of RAM) and rendered an animation in Macromedia Extreme 3D 2.0 (using 64MB of RAM) to determine performance of MMX-optimized operations. Both Power Macs and the non-MMX PC had 2MB of VRAM, while the MMX PCs all had 4MB of VRAM. All the PCs ran Windows 95, while all Power Macs ran System 7.5.3. All tests were done on 17-inch monitors running 24-bit color.—**Macworld Lab testing supervised by Chris Uiterwijk**

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Circle 26 on reader service card

New Products

THE LATEST MACINTOSH RELEASES

COMMUNICATIONS

Browsing the Mainframe

Who would ever have thought you'd be able to access mainframe applications through a Web browser? White Pine Software (603/886-9050, *http://www.wpine.com*) has succeeded in doing just that. White Pine's $69 WebTerm Toolbox lets users access legacy mainframe applications over a corporate intranet by embedding VT420, TN3270, and TN5250 windows into a Web page for user access to Digital Equipment, Unix, and IBM mainframe hosts. You can create buttons, menus, and palettes using JavaScript.

DISPLAY

Lighter, Brighter Presentations

Whether you're on the road or at the home office, these new color LCD projectors from Proxima, NEC, and Sharp will light up your day.

• Sharp's (201/529-8731) 20-pound $5995 XG-E690U supports the Mac 832-by-624-pixel resolution by automatically panning its 800-by-600-pixel display. Sharp has also released the $8995 XG-E1100U, which offers convergence and center-to-corner image uniformity that are improved over those of the previous XG-E1000U.

• The 11-pound LightBook ($4999) from Proxima (619/457-5500, *http://www.prxm.com*) can fit into a PowerBook-size case and sports a rugged exterior, a simple setup that automatically adjusts for hardware type (Mac or PC), an image size of 4 to 14 feet diagonal, and support for multiple resolutions (640 by 480 or 600 by 800).



Sharp's XG-E1100U

• NEC Technologies (508/264-8000, *http://www.nec.com*) has introduced the 15.6-pound MultiSync MT800 LCD projector ($9999), which supports standard Macintosh and PC resolutions of 640 by 480 pixels to 1280 by 1024 pixels. Its image brightness is rated at 350 ANSI lumens, and it comes with a remote that can control both the projector and the image source, such as a PowerBook, so you don't need to juggle a remote and a mouse during your presentation.

ENTERTAINMENT

Quick Hits

Don't have time for a multihour gaming session? MacPlay's (714/553-6655, *http://www.macplay.com*) $39.95 Pro Pinball lets you leave behind your mundane world and smack a few balls around a 3-D table. If you can manage to play just one game, Bubble Trouble ($15) from Ambrosia Software (716/325-1910, *http://www.ambrosiasw.com*) requires you to fight for survival by dodging piranhas and other underwater nasties while attempting to squish them with giant bubbles.

A Marathon by Any Other Name . . .

With Marathon Infinity ($69.99), Bungie Software (312/563-6200, *http://www.bungie.com*) extends its popular line of first-person carnage fests. Infinity includes Blood Tides of Lh'owon, a new 30-level scenario; Forge, Bungie's map editor; and Anvil, a tool for modifying shapes, sounds, and physics models.

Marathon is also spawning games based on Bungie's 3-D first-person shooter technology. ZPC, published by GT Interactive ($49.99; 212/726-6500, *http://www.gtinteractive.com*), uses artwork by MTV animator Aidan Hughes and a soundtrack by members of the Revolting Cocks and Ministry to place you in the role of avenging messiah with awesome psionic powers. If your tastes run more to government conspiracy, MacSoft (612/559-5140, *http://www.wizworks.com*) is publishing Prime Target (price not available at press time), also based on the Marathon engine. A senator has been brutally murdered, and you must fight your way through hordes of Secret Service agents in squeaky shoes to find out the truth behind the killing.



GT Interactive's ZPC

FINANCIAL

Tax Time

It's not April yet, but the Head Start versions of MacInTax ($34.95) and MacInTax Deluxe ($49.95) for 1996 are available from Intuit (800/446-8848, *http://www.intuit.com*). This year's versions include improvements to the final review of your federal tax return and an enhanced guide to state tax return preparation.

GRAPHICS

Poser Gets a Face-Lift

While the first version of Poser created figures that looked like mannequins, Poser 2 from Fractal Design ($249; 408/688-5300, *http://www.fractal.com*) features high-resolution models, improved import and export capabilities, and a keyframe-based animation system that incorporates inverse kinematics for more natural body movement. Poser 2 provides more realistic musculature and facial features, even before applying texture and bump maps. You can import any 3-D object as a prop, and link it to—or even use it to replace—a limb or other body part so that it merges seamlessly with, and moves naturally with, the figure.

New Effects for Ray Dream

Fractal Design has released two new plug-in packages for its 3-D modeling and rendering programs, Ray Dream Studio and Ray Dream Designer.

• Radical F/X ($149) incorporates Boolean operations that let you merge objects, add to or subtract from an object, and create a new object where two overlap. New deformers such as Wave, Punch, Dissolve, Explode, and Atomize let you create many different special effects, such as rippling water, swirling fog, and disintegration. Four new primitives add fire, clouds, volumetric fog, and fountains. All parameters can be fully animated when used with Ray Dream Studio.

• 3D Light Pack ($129), developed for Fractal by Rayflect, lets you create visible light cones emanating from spotlights, spherical halos around light sources, and glowing edges on objects.

INPUT

Play Hard

You can't churn and burn without the right equipment. Happily, companies are lining up to give Macintosh gamers the right stuff.

• Advanced Gravis (604/431-5020, *http://www.gravis.com*) is shipping the Mac Blackhawk ($69.95), a futuristic molded stick with a heavy base, four programmable buttons, and a throttle-control wheel. The Blackhawk is also compatible with the company's Mac MouseStick II.

• If you're looking for a set of pedals to put the finishing touch on your gaming setup (and to finish off

continues

New Products

your competition), CH Products (619/598-2518, *http://www.chproducts.com*) offers CH Pedals ($129.95) and CH Pro Pedals ($149.95). Both units will work with driving- and flight-simulation software, but the Pro Pedals slide forward and back to simulate rudder pedal movement realistically.



CH Products' Pedals

• The Formula T2 ($199.95) from ThrustMaster (503/615-3200, *http://www.thrustmaster.com*) brings a racing wheel to Macintosh desktops for the very first time. The steering wheel clamps to your desktop, and has a gear-change lever and two programmable buttons. Matching gas and brake pedals are mounted on a metal floor unit.

ONLINE

Web Publishers Parade On

If you don't like your current Web authoring tool, just wait a few weeks and you'll see a new one or an upgrade to an existing package.

• Symantec (541/334-6054, *http://cafe.symantec.com*) is putting the finishing touches on a $99 HTML authoring tool, Visual Page, that it says will look and act like common productivity programs such as Microsoft Word. Symantec says Visual Page will make it easier to move business documents onto corporate intranets. Visual Page sports a WYSIWYG interface, supports autosizing of HTML tables and frames, automatically converts PICT files to GIF format, and provides an interface to Apple's Java Virtual Machine.

• DeltaPoint's (408/648-4000, *http://www.deltapoint.com*) $99.95 Web-site development and maintenance tool, QuickSite, has just become available for the Mac. In QuickSites, wizards automate common HTML chores such as generating pages, creating links, and updating files. An integrated database means that with one mouse-click you can change a graphic in every page, some pages, or just one page on a 5000-page site.

Get Your Free Web Server

Pictorius (902/492-2880, *http://www.pictorius.com*) has reduced its Entrada Net Servers software to a hard-to-resist price—zero—and changed its name to Pictorius Net Servers. The HTTP servers offer full CGI/ACGI support, unlimited capacity for simultaneous users, and native Open Transport support.

PRODUCTIVITY

Database Vets Cross Swords

Two longtime Mac databases, Helix Express and 4th Dimension, have recently received updates. With Helix Technologies' (847/465-0242, *http://www.mcs.net/~hxtech*) $795 Helix Express 4.0 visual database environment, you can copy and paste database structures—abaci, forms, and relationships—from one database to another. Meanwhile, ACI US (408/252-4444, *http://www.acius.com*) is aiming the latest version of 4th Dimension directly at the Internet. 4D version 6.0 acts as its own Web server, converting 4D forms to HTML on the fly. The new version also features a data-structures browser, new commands, and a new debugger.

PUBLISHING

Scanning the Horizon

Flatbed scanners with 36-bit color depth keep getting less expensive.

• The $899 ScanAce III from PacificImage (310/214-5281, *http://www.scanace.com*) has adjustable CCD exposure, a cold-cathode lamp, and batch scanning. The scanner's optical resolution of 600 by 1200 dpi can be automatically interpolated up to 9600 by 9600 dpi.

• Epson's (310/782-0770, *http://www.epson.com*) Expression 636 ($899) has an optical resolution of 600 by 600 dpi, which can be interpolated up to 4800 by 4800 dpi.

Common Ground Is Back

Hummingbird Communications (416/496-2200, *http://www.hummingbird.com*) has shipped Common Ground Desktop Edition 3.0 ($195) for the Mac OS, Windows 3.1, Windows 95, and Windows NT. New for the Mac, a ProViewer adds the ability to annotate the portable documents with a table of contents, bookmarks, sticky notes, highlighting, and hyperlinks.

Still Life in Pixels

Sony Electronics (800/352-7669, *http://www.sel.sony.com*) has announced a new color digital still camera, the DKC-ID1 ($1795). It can capture 768-by-576-pixel images, comes with a 12× zoom lens and built-in flash, and can store up to 140 images on a 10MB PC Card.



Sony's DKC-ID1

STORAGE

Ultra Cool, Ultra Fresh, Ultra SCSI

Ultra SCSI drives and devices are starting to reach the market, doubling data-transfer rates and sending performance hounds digging into their wallets.

• StreamLogic (415/325-4392, *http://www.streamlogic.com*) is shipping PocketHammer drives and SledgeHammer Pro disk arrays ranging in capacity from 4GB to 66GB, as well as JackHammer host adapters.

• MicroNet (714/453-6100, *http://www.micronet.com*) is shipping its 3.5-inch, 9GB hard drives both as stand-alone units ($3980) and as modules for its DataDock family of transportable storage devices ($3930).

• APS's (816/483-6100, *http://www.apstech.com*) Q 1280 ($349.95), Q 2100 ($449.95), and Q 3200 ($599.95) drives are based on Quantum's Fireball TM mechanism and are available as internal drives for $100 less than the external price (quoted above).

• The Tomahawk series hard drives from Micropolis (818/709-3325, *http://www.micropolis.com*) come in 9.1GB (Tomahawk 9, $2900) and 4.55GB (Tomahawk 4LP, $1630) sizes.

UTILITIES

Take Your Mac to the Cleaners

The Mac has long been without uninstaller utilities, which delete applications and identify unused files when launched; similar applications are top sellers on the PC platform. Now Aladdin Systems (408/761-6200, *http://www.aladdinsys.com*) is publishing Spring Cleaning, an updated commercial version of the shareware uninstaller application LaundroMac (price not available at press time). According to Aladdin, the application will remove unneeded code from fat binary applications, find orphaned aliases and preferences, and identify unused fonts.

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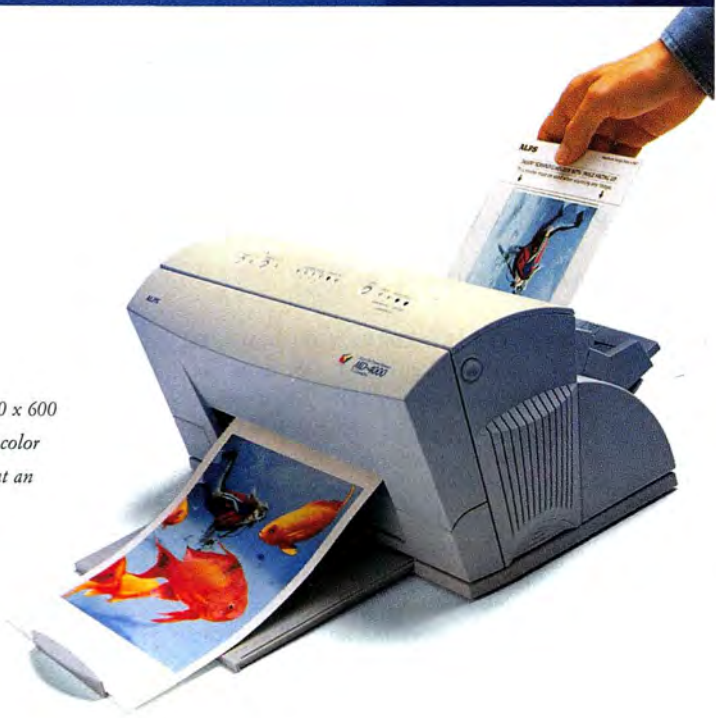


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Reviews

FreeHand Graphics Studio 7

NEAR-PERFECT DRAW PROGRAM, HO-HUM IMAGE EDITOR



AFTER I RECOMMENDED MACROmedia FreeHand 5.5 over its competition ("The Illustration Challenge," January 1997), it's hardly a surprise that I think FreeHand 7 is the best drawing program currently available for the Mac. What *is* surprising is just how much better the new FreeHand is. This is easily the most vigorous enhancement since Macromedia purchased the product in late 1994. Areas that used to be the exclusive domain of Adobe Illustrator—32-color gradients, charting, and pixel swapping with Adobe Photoshop—are now handled as well or better in FreeHand 7. And where Illustrator is weak—autotracing, blending, and distortion effects—FreeHand gleefully redoubles its efforts.

Macromedia hopes to capitalize on the strength of FreeHand 7 with the Graphics Studio suite. You can still purchase FreeHand 7 by itself, but for just $50 more you get the new xRes 3 for image editing, Extreme 3D 1.0 for three-dimensional drawing, and Fontographer 4.1 for editing fonts. A new version of Extreme 3D was supposed to be included, but it wasn't ready in time. Macromedia has promised to send registered users a free upgrade; look for a separate review of Extreme 3D 2.0 when it ships. And because Fontographer 4.1 hasn't changed significantly from version 4.0 (see *Reviews*, October 1994), it isn't reviewed again here.

Neither xRes nor Extreme 3D is so decidedly superior to its competition as FreeHand—xRes in particular remains a mixed bag—but they nicely round out what is indisputably the best graphics suite for the Mac.

Herding the Palettes

FreeHand 5.5's weakest link was a rambling, clunky interface fragmented by randomly placed options and odd-size palettes. Although version 7 doesn't entirely solve the problem, it makes some important changes. About half the palettes include tear-off panels so you can compile your own palettes, as you can in Photoshop. For the first time in FreeHand history, you can gather the program's far-flung color options into a single palette. Version 7 also assembles its text-formatting options into one palette. But my favorite revision is the Align palette, which lets you move objects by clicking inside an intuitive grid.

FreeHand 7 also introduces an interface-customization concept: you can snap two palettes together so they move, display, and hide as one on screen. There

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Outstanding ★★★★★= 9.0–10.0 Very Good ★★★★= 7.0–8.9 Good ★★★= 5.0–6.9 Flawed ★★= 3.0–4.9 Unacceptable ★= 0–2.9

are a few imperfections to this "docking" technique—you can't dock the toolbox with the two plug-in tool palettes, and the menu doesn't show with perfect accuracy which docked palettes are visible—but it's an excellent idea.

More-Capable Illustration Tools

Many Illustrator users' loyalty hinges on the pen tool, which draws lines and shapes on screen with perfect smoothness. For the first time, FreeHand's pen tool works as smoothly as Illustrator's; the new points and handles even look like Illustrator's. It's a welcome change, but as a longtime Illustrator user I miss the ability to align individual points in FreeHand as I can with Illustrator. It also takes more effort in FreeHand to drag an entire object by an anchor point and snap it to another object, the basic shape tools aren't as flexible as Illustrator's, and handles don't snap to guides when you're drawing.

FreeHand altogether outclasses Illustrator in tracing scanned graphics, however. Where Illustrator traces one path at a time and invariably fills it with the default color, FreeHand 7 is intelligent enough to trace multiple paths and fill them—according to the hues in the original image—with up to 256 colors (see "Full-Color Autotrace"). It even includes edge-calculation controls rivaling those in Adobe's stand-alone tracing utility, Streamline. FreeHand does produce ragged lines that don't remotely resemble hand-drawn paths, but no other program gives you so much accuracy for so little effort.

FreeHand 7 also offers greatly improved gradients that let you add up to 32 colors within a linear or radial gradation. You can't adjust the midpoints between color transitions or define the angle of a gradient by dragging inside a shape with a tool, as you can in Illustrator, but what FreeHand lacks in control it makes up for in simplicity: you don't have to visit a separate dialog box to name a gradient fill as you do in Illustrator, and you can drag and drop colors into gradients with remarkable ease. I had the feature mastered in minutes without so much as a glance at the manual.

Where editing and effects are concerned, FreeHand's cup runneth over. Version 7's integrated search function lets you globally replace fills, strokes, and other graphic attributes. You can chart numerical data from a single dialog box, making the process much less convoluted than it is in Illustrator. A new enveloping feature lets you apply eight-point distortions from inside a dialog box. Best of all is FreeHand's enhanced blend feature: you can now blend simultaneously among three or more objects, all of which remain fully editable, and you can fit the blend to a path. Deneba's Canvas offers more blending bells and whistles (see *Reviews*, December 1996), but FreeHand is significantly more stable.



Full-Color Autotrace FreeHand 7's revamped autotrace tool converts a low-resolution image (left) to a collection of colored paths (right), automatically filling the paths with 16 colors according to the tonal values in the original.

The Imaging Struggle

The other upgraded member of the Graphics Studio, xRes 3, has barely changed from its previous incarnation (see "Ultimate Imaging," *Macworld*, June 1996). Changed from the previous version, you can embed URLs in graphics, dither images to various application-level palettes, create scalable Shockwave graphics, and rasterize vector objects, but the number of problems that haven't been addressed in this revision is alarming. xRes gobbles up scratch disk space like no other image editor. Its Undo function is flawed, the type tool can't kern, and the effect of layer calculations inverts when you switch from RGB to CMYK mode. The program doesn't even display a watch cursor when it keeps you waiting. This is a disappointing revision indeed.

Luckily, FreeHand 7 is every bit as compatible with Photoshop as it is with xRes. You can drag images from Photoshop and drop them into FreeHand, copy objects from FreeHand and paste them into Photoshop as clipping paths, and otherwise swap data between the two programs. FreeHand even goes one better than Illustrator, allowing you to open an imported TIFF image in Photoshop by double-clicking on it.

The Last Word

Any regular user of drawing programs knows that version numbers are largely meaningless. Although Macromedia is likely to catch some heat for skipping version 6 in its zeal to have the first drawing program to turn 7, you might recall that Deneba never released a Canvas 4 and that Illustrator leapfrogged from version 3 to version 5 on the Mac.

Equally misleading is the vendor's suggested price. Macromedia has abandoned any mention of retail pricing, preferring to quote estimated street prices—$449 for the Graphics Studio; $399 for FreeHand, xRes, or Extreme 3D alone; and $349 for Fontographer alone. That sounds impressive compared with Illustrator's $595 retail price, but calls to mail-order houses revealed Graphics Studio to be more expensive than Illustrator, Canvas, or CorelDraw Suite, all of which hover in the $400 range.

But while FreeHand 7 is neither the oldest nor the least-expensive drawing program, it *is* currently the best. It's more powerful than Illustrator and more reliable than either Canvas 5 or CorelDraw 6. The Graphics Studio bundle suffers from a negligible upgrade to xRes and the delay of Extreme 3D 2.0, but it's still several times more capable than the confused CorelDraw Suite, and better-organized to boot. Macromedia has made an effort to synthesize the programs in the bundle, imposing shared file formats and drag-and-drop integration—both of which CorelDraw lacks. For now, FreeHand Graphics Studio is the only suite that provides professional-level power at an affordable price.—DEKE McCLELLAND

FreeHand Graphics Studio 7

GRAPHICS STUDIO ★★★★/7.9
FREEHAND 7 ★★★★/8.7
XRES 3 ★★★/5.2

PROS: Improved interface; improved pen and autotrace tools; true 32-color gradations; can blend along a path; can swap data with Photoshop. **CONS:** Weaker point-editing controls than Illustrator's; xRes 3 leaves many problems unresolved. **COMPANY:** Macromedia (415/252-2000, *http://www.macromedia.com*). **COMPANY'S ESTIMATED PRICE:** $449.

Web Authoring Programs

HOTMETAL PRO, ADOBE PAGEMILL GET OVERHAULED

SOFTQUAD'S HOTMETAL PRO 3.0 and Adobe PageMill 2.0 let you assemble professional-looking Web pages without the laborious task of manually typing HTML tags. Both products have improved dramatically over earlier versions, but PageMill's WYSIWYG approach to Web design is far more appealing than the powerful but quirky HoTMetaL Pro's.

HoTMetaL Pro 3.0

A little more than a year ago, HoTMetaL Pro's hostile, non-Mac interface and rampant performance glitches earned it a dismal one-star rating (see *Reviews*, January 1996, and "Web Authoring's New Tools," October 1996). HoTMetaL Pro 3.0 is a dramatic improvement: it offers better support for drag and drop, it's much more user-friendly, and it's at last starting to look like a Macintosh program. Unfortunately, not all the flaws have been eradicated in the new version.

Like most Web authoring tools, HoTMetaL lets you enter text (or import it from a word processor), then format it without having to type in the HTML tags; you apply font attributes, colors, paragraph alignment, and so on by clicking on buttons or using menu commands. HoTMetaL inserts the appropriate tags, displaying them as small icons straddling the text (see "Tagging Along").

But while programs such as Adobe PageMill and Claris Home Page are designed to shield you from HTML code, HoTMetaL is designed for Web authors who want to see the code and tinker with it. SoftQuad accurately describes HoTMetaL as "quasi-WYSIWYG": you can hide the HTML tags with the click of a button, but the resulting view is only a rough approximation of how your document will look; to get an accurate preview of your work, you have to launch a browser. Fortunately, the program lets you set up one-button access to up to four browsers so you can quickly see the results.

HoTMetaL is definitely more user-friendly than it used to be. For example, you can use Apple's Color Picker to assign colors to backgrounds and fonts rather than typing hexadecimal codes into dialog boxes. Even more-sophisticated tasks—such as creating tables, forms, image maps, and frames—are fairly simple with HoTMetaL 3.0 (though not nearly as easy as with PageMill). The Graphical Frames Editor, for example, makes it easy to subdivide a page; you simply drag and resize the partitions within the editing window, then drag existing HTML documents into each frame to link it with its content. (You can't, however, actually see the content in the frames without viewing the document in a browser.) The process is fast and intuitive, and the results are excellent.



Tagging Along In HoTMetaL Pro, HTML tags appear as small icons on the page; clicking on one of them selects the element surrounded by the tags. You can customize the look and size of the tags, but not the numerous tool palettes.

The program's use of drag and drop is also impressive. You can drag and drop text within and among documents (a great way to grab chunks of HTML code from existing documents) and drag image files from the desktop onto your page. To create a link to an existing HTML file, you simply drag that file onto your document.

Unfortunately, HoTMetaL's interface still has some irritating weaknesses. The 60 or so tiny buttons on the cramped, cluttered tool bars and palettes are hard to use, and you can't reconfigure the palettes or even choose where the tool bars are anchored. Many basic commands still lack keyboard shortcuts, and while the program does have an integrated macro editor and a spelling checker, both are poorly implemented. You can't, for example, record a macro to insert a tag in existing text, and the spelling dictionary flags such words as *don't* and *you'll* as incorrect.

Opening existing Web pages with HoTMetaL is also still a problem. Although it supports the HTML 3.2 specification, as well as a number of Netscape and Microsoft extensions, it generates an error message as soon as it encounters a string of code it doesn't understand, then refuses to open the document or opens it as plain text. And although the program can open files from several word processors and convert them into HTML documents, the results are mixed. It did a superb job of converting a Microsoft Word 5 table into an HTML table, but it randomly refused to open other Word documents at all. Oddly, HoTMetaL choked on table tags that PageMill had no trouble understanding.

PageMill 2.0

In its first incarnation, PageMill offered a WYSIWYG Web authoring environment that was clean and simple—too simple, in fact. While version 1.0 was ideal for entry-level users taking their first baby steps into Web-page creation, its text-formatting options were extremely limited; it also lacked the ability to display HTML source code or to handle more complex elements such as tables and frames (see *Reviews*, March 1996).

In version 2.0, Adobe gives the program the power it needs to handle frames, tables, image maps, and sophisticated text formatting while retaining the polished, unintimidating interface that made the original program so appealing.

Where HoTMetaL's quasi-WYSIWYG view approximates what your finished Web pages will look like, PageMill almost lets you forget you're generating HTML. A simple, uncluttered tool bar gives you access to key formatting commands and lets you add forms and tables by clicking on buttons (see "It's a Drag"). (Virtually all the formatting commands—font size, style, and paragraph alignment, for example—also have keyboard shortcuts.) An improved Inspector palette lets you tweak a number of other attributes, such as default colors and font sizes, and the new Color Panel palette lets you store up to 16 custom colors and apply them



It's a Drag PageMill's drag-and-drop approach makes for easy Web-page editing. For example, the Pasteboard palette (lower right) lets you store frequently used objects, such as logos and buttons, and drag them onto your pages.

by dragging and dropping color swatches onto selected text.

The program's tables and frame-editing tools are extremely intuitive and vastly superior to those in HoTMetaL Pro. You configure a table simply by dragging columns and rows to the desired width and height; you can create even more-complex tables by embedding cells within other table cells, again by dragging and dropping them into a new configuration. The Inspector palette has easy-to-understand controls for changing border widths, cell padding, alignment, and background colors.

The first version of PageMill took pains to shield users from the underlying HTML—you couldn't even *look* at it, much less edit it. That proved disappointing for many HTML programmers; sometimes it's useful to examine the HTML tags, and even copy and paste chunks of code. With PageMill 2.0, you can toggle into HTML Source mode and see what PageMill is doing behind the scenes. In that mode you can directly edit existing HTML tags or type in new ones. PageMill's WYSIWYG interface is still no substitute for previewing your work with an actual Web browser, however; I found that the program's rendering of various HTML tags occasionally differed substantially from Navigator's.

Overall, the program's drag-and-drop approach to document creation is slick, but it's not implemented consistently. With the Color Panel, for example, you can apply colors by dragging swatches directly onto selected text, but not by dragging them onto table cells. And although PageMill, like HoTMetaL, opens documents in popular word processor formats, translation doesn't always give you the desired results. For example, the program converted all the paragraph marks in my Word 6 documents into line breaks, turning each document into one long paragraph. Another glitch turned up in the program's Find/Replace command: the Replace All feature failed to catch all occurrences of a specified search string. I also found PageMill irritatingly slow when working with larger documents, particularly those containing many table elements. In fact, PageMill couldn't open some HTML documents at all unless its memory allocation was boosted by 2MB.

Finally, the program continues to support forms creation, but it doesn't let you set up a Post command to make the form functional; you have to create CGI scripts to use the forms you lay out in PageMill. HoTMetaL, on the other hand, lets you link forms to an e-mail address using the mailto: protocol.

The Last Word

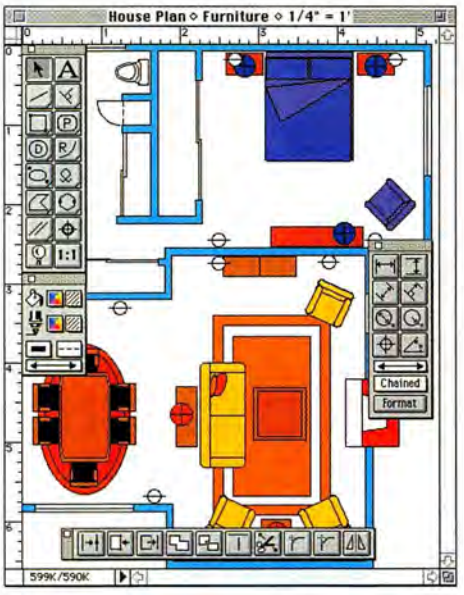
HoTMetaL Pro 3.0 doesn't claim to be a WYSIWYG Web editor. Even so, you have to put up with a lot of quirks to benefit from its ability to handle more-sophisticated HTML markup tasks. Most users, even those who are HTML-savvy and want to create fairly sophisticated Web pages, will find PageMill's authoring environment far more efficient and a lot less frustrating.—JOSEPH SCHORR

Adobe PageMill 2.0

RATING: ★★★★/7.7 **PROS:** Superb table and frames editing; uncluttered WYSIWYG interface; lets you view and edit HTML source code. **CONS:** Inconsistent use of drag-and-drop formatting; inconsistent import filters; can't activate forms without CGI scripts; slow performance on larger documents. **COMPANY:** Adobe Systems (408/536-6000, *http://www.adobe.com*). **LIST PRICE:** $149.

HoTMetaL Pro 3.0

RATING: ★★/4.2 **PROS:** Strong drag-and-drop support; graphical frames editor; opens and converts standard word-processing documents. **CONS:** Lacks true WYSIWYG view; quirky interface; unreliable import filters. **COMPANY:** SoftQuad (416/544-9000, *http://www.softquad.com*). **LIST PRICE:** $159.



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Midrange Mac Systems

CHOICES DIFFER ON FEATURES, NOT SPEED

DREAM ALL YOU WANT ABOUT speed demons like Power Computing's 225MHz PowerTower Pro—the reality is that most of us buy more affordable systems. It is in this class—with Apple's Power Mac 7600 and Power Computing's PowerCenter—that Motorola's StarMax 4000 and Umax's SuperMac J700 compete.

The StarMax 4000's 180MHz and 200MHz models come in two configurations: DT604e desktops and MT604e minitowers. (Motorola was unable to supply a 200MHz desktop system for this review.) Umax's SuperMac J700 desktop is available in 150MHz and 180MHz versions (although Umax couldn't provide the 150MHz version in time for testing.)

The newest crop of mainstream Macs benefit from their new PowerPC 604e CPUs, as shown by the performance gap between the 160MHz 604e-based StarMax 4000 systems and the 150MHz 604-based PowerCenter (see "New Office Systems Beat Old Standbys"). It's no surprise that Macworld Lab found few significant speed differences among same-megahertz systems—every vendor is optimizing performance with similar bags of tricks. (Although Apple's Power Mac 8500/180 looks poky compared with the J700/180, remember that Umax uses the Power Mac 9500's faster motherboard architecture.)

Where these new offerings differ is in their system design. The SuperMac J700 beats both the PowerCenter and Power Mac 7600, sporting four PCI slots, eight DIMM slots, and 4MB of VRAM. The J700's sound jacks are located on the front of its case—something every system should do. Although the J700's design makes it difficult to open, adding drives to the two free bays is relatively simple.



ARNOLD TSEJO

StarMax 4000 (left) and Umax J700

The J700/180 offers a good balance of features and strong performance. Its only major drawback is its price: at $3095, it costs about $700 more than a PowerCenter or Power Mac 7600 equipped with comparable VRAM. Still, you get a significant speed increase for that extra money: the J700 competes well enough against the PowerCenter 150 to share the honor of Editors' Choice with it for best office Mac (see "Mac Superguide" in this issue).

Motorola's StarMax 4000 systems perform decently, but they cut corners where their competition doesn't. Unlike other Mac systems, they lack internal SCSI connectors—you have to buy a card to use *any* of the internal drive bays. Its nonupgradable CPU is an omission not worth the $5 savings in manufacturing costs. The video port's VGA connector lacks a Mac adapter, and its three RAM slots are unduly limiting, especially on the tower models.

The Last Word

Though the StarMax 4000 prototypes were impressive (see "Motorola's Hot New Macs," November 1996), my enthusiasm for these systems has cooled considerably—they compromise many basics at a time when competitors have lowered their prices. The PowerCenter 150 remains the top office system if you need a low price, though Umax's SuperMac J700/180 is best if you want high performance.—GALEN GRUMAN

StarMax 4000 Series

★★★/6.2 **STARMAX 4000 DT604E-160**

★★★/6.0 **STARMAX 4000 MT604E-160**

★★★/6.0 **STARMAX 4000 MT604E-200**

PROS: Decent performance. **CONS:** Nonupgradable CPU; no VGA-to-Mac video adapter; limited RAM expansion; no internal SCSI or secondary EIDE connectors. **COMPANY:** Motorola Computer Group (800/759-1107, *http://www.mot.com/computer/*). **COMPANY'S ESTIMATED PRICE:** DT604e-160 $2595; MT604e-160 $2995; MT604e-200 $3595.

SuperMac J700/180

RATING: ★★★/6.9 **PROS:** Strong performance, good expandability. **CONS:** Case is difficult to remove. **COMPANY:** Umax Computer (510/226-6886, *http://www.supermac.com*). **COMPANY'S ESTIMATED PRICE:** $3095.

MW LAB

New Office Systems Beat Old Standbys

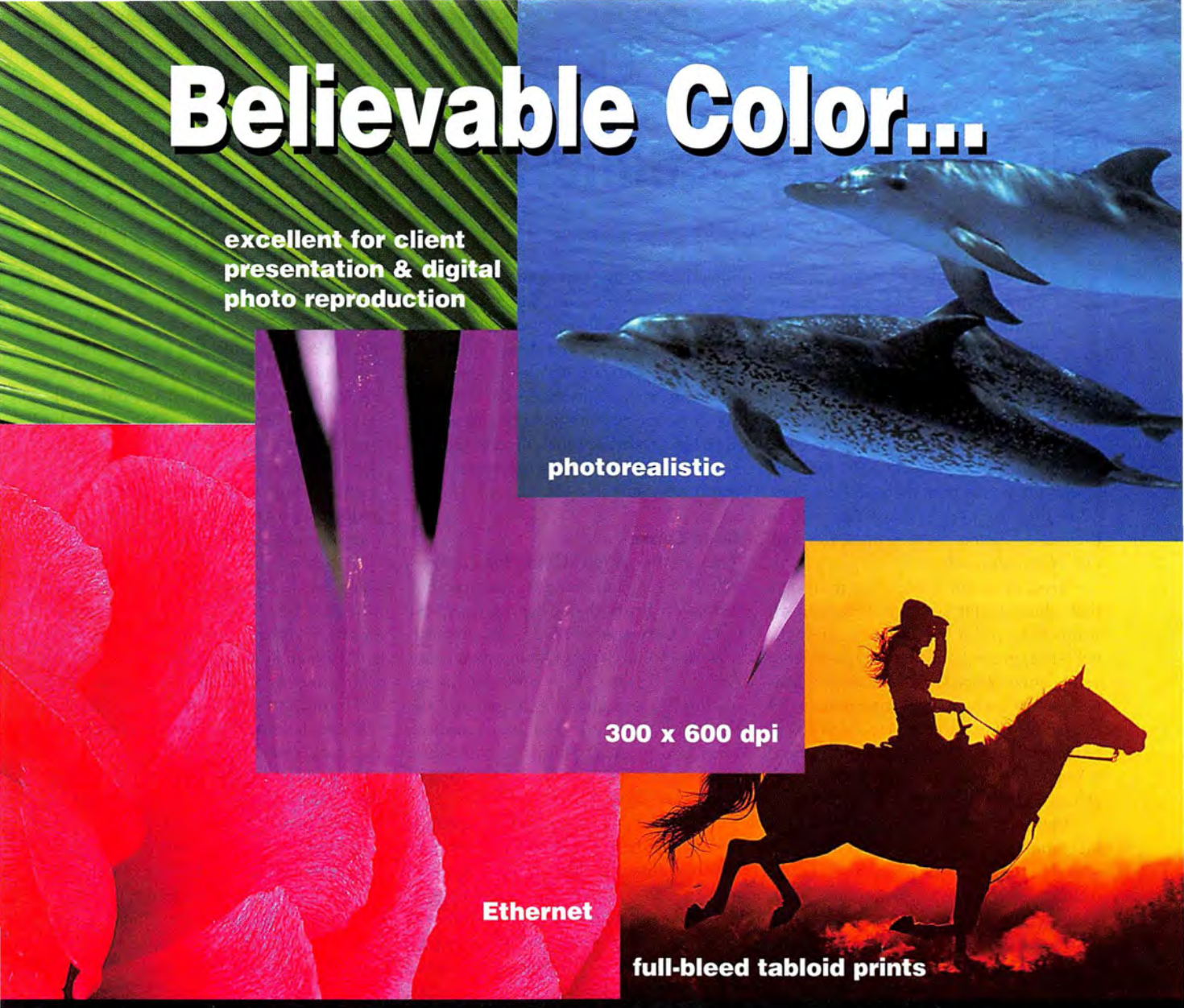
Longer bars are better. Results are times as fast as a Centris 650 (Centris 650 = 1.0). Products are listed in order of overall performance. Boldface indicates products reviewed here.

	Overall Score	CPU-Intensive	FPU-Intensive	Disk-Intensive
Power Computing PowerTower Pro 200	8.5	8.4	12.7	3.5
Motorola StarMax 4000 MT604e-200	7.7	7.9	11.3	2.7
Apple Power Macintosh 9500/200	7.7	7.5	12.1	2.9
Umax SuperMac J700/180	7.3	7.4	10.9	2.2
Motorola StarMax 4000 MT604e-160	6.9	7.1	9.7	2.6
Apple Power Macintosh 8500/180	6.7	6.6	10.3	2.4
Motorola StarMax 4000 DT604e-160	6.6	6.7	9.7	2.2
Power Computing PowerCenter 150	5.6	5.9	7.5	1.8
Apple Power Macintosh 7600/132	5.0	5.1	6.9	2.5

Behind Our Tests

For details on our methodology, see *Mac Superguide*, January 1997.—Macworld Lab testing supervised by Mark Hurlow

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PRICE	$7,999	$9,999	$14,995*	$17,995	$9,995
Processor Speed	24 MHz	33 MHz	24 MHz	133 MHz	Host Based**
Interpreter	Printer Based	Printer Based	Printer Based	Printer Based	Host Based
Max Image Area	11.95" x 17.4"	12.17" x 17.53"	11.9" x 17.2"	12.16" x 18"	11.95" x 17.4"
Ethernet Option	Yes	Yes†	Yes†	Yes†	No
Resolution	300 x 600	300 x 600	300 x 300	300 x 300	300 x 300
Internal Hard Drive	260 MB	540 MB	No	No	No
Std/Max RAM	24 MB/24 MB	24 MB/136 MB	32 MB/112 MB	48 MB/112 MB	Host Based
Photoshop Plug In	No	Yes	Yes/Mac Only	Yes	Yes

† EtherTalk, NetWare, TCP/IP
* Requires 48 MB RAM to support 4-color proofing
** Requires a dedicated workstation with a minimum of 20 MB RAM and 160 MB of space for optimum performance

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High-Fidelity Scanners

MORE BITS AREN'T ALWAYS BETTER

LIKE THEIR PERSONAL COMPUTER counterparts, desktop scanner manufacturers generally revamp their products to provide more power for less money over time. Following this trend, the latest batch of low-cost color scanners—the Apple Color OneScanner 1200/30, Agfa's StudioStar, and the Epson Expression 636—support higher bit depths than their predecessors, 30 in the case of Apple and Agfa, 36 in the case of Epson. But are more bits better? Not necessarily.

True, these scanners capture more data than their 24-bit siblings. Where most scanners record 8 bits of color per channel—red, green, and blue—high-fidelity scans contain 10 or 12 bits of data per channel; the final image is downsampled to 24 bits before it's sent to the Mac. High-fidelity technology has existed in higher-priced scanners for years, but hasn't been available in the sub-$1000 class until recently.

In theory, this process lets 30- and 36-bit scanners create a superior copy of your artwork, but because much of the image quality rests on the integrity of the hardware and the interpolation process, higher bit depths don't necessarily translate into better results—as these scanners illustrate.

Agfa recently added the StudioStar to round out the low end of its line, Apple touts the Color OneScanner 1200/30 as a superior alternative to the lackluster Color OneScanner 600/27 (*Reviews*, July 1996), and the Epson Expression 636 replaces the ES-1200C, the Editors' Choice from our last roundup ("Scanner Solutions," *Macworld*, March 1996).

Macworld Lab's tests evaluate the objective measures of scanning success: speed and image quality. But as good as a scanner is, its bundled software should be a big factor in your purchase. Although acquisition software isn't—and shouldn't be—a replacement for high-powered editing applications, you should be able to perform basic tasks like tonal corrections, scaling, and image sharpening before you make your final scan.

Good Looks . . .

Though the Apple Color OneScanner 1200/30 turned in the best color scanning times—far better than when we tested the Color OneScanner 600/27—its previews took two to three times longer than either Agfa's or Epson's. The 1200/30's image quality is acceptable, but apparently the jump from 27-bit to 30-bit hasn't paid off; I was hard-pressed to find much difference in scan quality between the 1200/30 and its cheaper predecessor.

Macworld Lab put the scanners through a battery of tests designed to show how well they handle scanned images and how fast they obtain them. The Expression 636 turned in the fastest times overall for previews and scans, although it lagged behind the Color OneScanner by more than 10 seconds for final color scan times. The Expression's gray-scale and color image quality was noticeably better than that of its predecessor, the ES-1200C.

The Agfa StudioStar turned in slow times for final color scans, but acceptably fast previews. It's worth the wait, though: image quality is first-rate—even superior to the Epson's—proving that a 30-bit scanner isn't necessarily outclassed by a 36-bit model. If you're willing to put up with its steep learning curve, you'll also be able to accomplish a lot of tweaking with Agfa's software, saving time in the long run—the better your scan, the less time you'll spend fixing it in Photoshop.

. . . and Personality

The Apple Color OneScanner 1200/30's small, sleek case is ideal for a crowded desktop, and—as with most Apple products—its documentation is excellent, and installation takes just minutes. Unfortunately, Apple doesn't give you a SCSI cable (both Agfa and Epson do), so if you bring the unit home without one, you'll have to make another trip to the store before you can try out your new purchase.

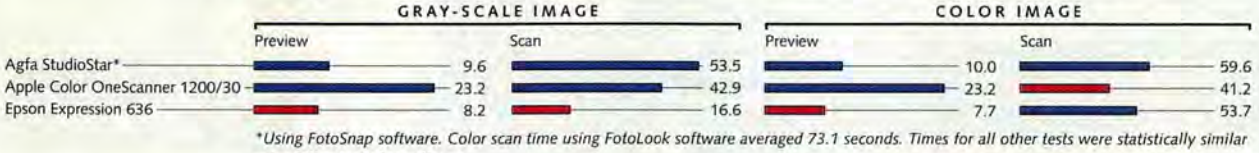
Apple's OneScanner Dispatcher software can handle everything from basic scanning to OCR, but you also get an Adobe Photoshop–compatible plug-in—good news, since you'll want to look to Photoshop or a similar program to exact the most from your scans. At best, Apple's software is competent, if lackluster; it sets exposure, crops and straightens automatically, and handles minor color corrections and scaling (but no image sharpening). Apple bundles ColorSync 2.1 for color matching, and special editions of Kai's PowerTools and MetaTools' Convolver.

Agfa's software runs as a stand-alone program, or as a plug-in to Photoshop or QuarkXPress. For quick scans, FotoSnap PS captures images without allowing a lot of tweaking. A second software option, FotoLook PS, adds a rich range of image-adjustment options, but you'll need to pore over the documentation to harness all of its power. For experienced desktop or Web publishers, the investment is worth it; you'll treasure FotoLook's image-control capabilities. The software's only drawback is that it surrounds your preview image with a black background, making cropping dif-

MW LAB

Hi-fi Scanners Run the Speed Gamut

= Best result in test. Times are in seconds. Shorter bars are better. Products are listed in alphabetical order by company name.



*Using FotoSnap software. Color scan time using FotoLook software averaged 73.1 seconds. Times for all other tests were statistically similar using either scanning software.

Behind Our Tests For information on our test methodology, see "Scanner Solutions," March 1996.—**Macworld Lab testing supervised by Jeff Sacilotto**



SUZANNE ROADY

The Epson Expression 636, Apple Color OneScanner 1200/30, Agfa StudioStar

ficult. Agfa supplies extras such as a Gamma control panel for monitor calibration and a FotoFlavor plug-in for color correction.

The StudioStar earns the dubious honor of having the worst manual of the lot. Its *Getting Started* book—the largest printed piece—offers only a few short pages on basic installation (including irrelevant details about installing a SCSI card on a PC), and the full manual is provided only in electronic form.

Agfa's software requires five installations from two separate CDs just to get the basics. All told, you'll inflate your hard drive with nearly 37MB of files if you install all of the software and documentation. Once everything is installed, it takes a while to sort out the various software components and to learn how to get the best performance from your scanner.

Like Apple, Epson provides an excellent manual and a simple installation process. The EpsonScan II utility's friendly interface handles routine image-editing chores with ease, but you'll still want to study the manual to understand it well. Scanning preferences can be saved and selected from a scrolling list, and a screen-calibration utility sets up your monitor's ideal gamma. Unlike Apple's and Agfa's scanning software, Epson's uses TWAIN—an interface more popular in the Windows world—to link with other programs. Since Photoshop is TWAIN-compliant, the result is the same as using a dedicated plug-in.

On a purely aesthetic note, the Expression is the quietest scanner of the three. Rather than the typical high-pitched screeching of its competitors, the Expression makes a soft whir as it scans.

The Information Bandwagon

Not wanting to miss the latest trend toward document-centric computing, this class of scanners is hyped as a complete document-organization solution—they're not just for digitizing artwork anymore. Their bundled software converts documents to editable text via optical character recognition (OCR), and they can fax or print your scanned documents in a single step, in effect making your scanner into a desktop fax or photocopier. None of these capabilities are particularly innovative, but they've gotten more convenient year by year.

Epson uses Second Glance's ePaper, a document-management utility, to organize your scans for copying, faxing, and archiving; Xerox TextBridge handles OCR chores. Similarly, Agfa offers a limited edition of Caere OmniPage for OCR, and its SoftCopy turns your StudioStar scanner into a copying machine when it's connected to a printer.

The Color OneScanner provides similar faxing, printing, and copying capabilities from within its Dispatcher 2.0 software. Apple goes a step further—and perhaps a step too far—by positioning the Color OneScanner 1200/30 as a complete Internet scanning solution. At first blush, it seems an intoxicating idea: you simply place your document on the scanner's bed and it generates a page of HTML code. Unfortunately, it's not as easy as it sounds, nor as complete as it could be.

Using simple text pages printed on a 600-dpi laser printer, Apple's HTML translation—which uses a proprietary version of TextBridge—was less than stellar. Tags for larger, bolder text, for example, were missing from the converted document. Don't assume that you can put a newsletter on the platen and magically end up with a full-blown Web page full of formatted text and graphics, either. Using this method, photos and graphics aren't placed (or even scanned), and text translation isn't a one-step process. Frankly, anyone with even rudimentary HTML skills could do better in less time.

The Last Word

The Apple Color OneScanner 1200/30 is a disappointment. Aside from faster color scanning speeds, it offers little if any advantage over its predecessor to justify its higher price tag—hence its lower rating. Serious graphic professionals will treasure the Agfa StudioStar's high-quality scans and powerful software, but the Epson Expression 636 gets the nod for all-around use. Offered in four bundles—from a $799 scanner-only version to an $1899 professional kit with a transparency adapter and full versions of Live Picture and Kai's Power Tools—Expression is suited to most uses.

Before you plunk down money on one of these models, though, you'll want to take a long, hard look at the Umax Vista-S6E (*Reviews*, July 1996). It's not a high-fidelity model, but this scanner offers competitive scanning speeds and image quality at a street price under $300. *Macworld* will also be revisiting scanners priced under $700 in the March 1997 issue, so be sure to check back next month if you're still sitting on the fence.—GENE STEINBERG

Agfa StudioStar

★★★★/7.5 **PROS:** High-quality scans; powerful software; speedy previews. **CONS:** Slow final scan speeds; difficult software setup; slightly steep learning curve for software. **COMPANY:** Agfa (508/658-5600, *http://www.agfahome.com*). **LIST PRICE:** $989.

Apple Color OneScanner 1200/30

★★/4.8 **PROS:** Attractive case design; easy-to-use software; fast setup; strong documentation. **CONS:** Slow previews; so-so image quality; mediocre software; lacks SCSI cable. **COMPANY:** Apple Computer (408/996-1010, *http://www.apple.com*). **LIST PRICE:** $799.

Epson Expression 636

★★★★/8.4 **PROS:** Very good scans; easy-to-use software; fast setup; good documentation. **CONS:** None significant. **COMPANY:** Epson America (310/782-0770, *http://www.epson.com*). **LIST PRICE:** $799 to $1899; $899 as tested.

Quicken Deluxe 7.0

INDISPENSABLE FINANCIAL MANAGER

QUICKEN HAS BECOME MORE POWerful and easier to use with version 7. The CD-ROM–based Quicken Deluxe 7 adds financial planning tools, a home inventory program, and additional investment information, including a mutual funds database, to the main program (available on floppies for $39.95 as Quicken 7). Either version is a worthy upgrade.

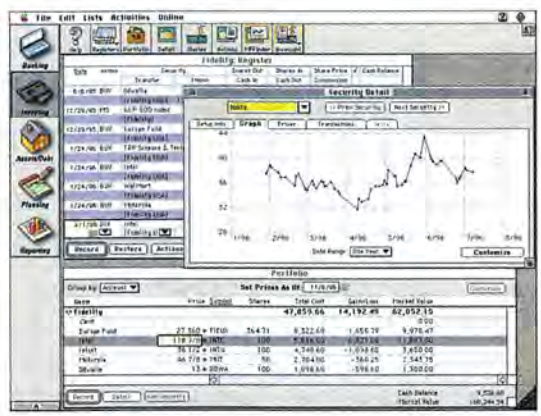
The first thing you'll notice in Quicken 7 is the new, cleaner interface. Last year's tool bar tried to encompass all of Quicken's functions but was overwhelmed by the sheer number of buttons needed. This year, Quicken gives you a palette on the left side of the screen, from which you can choose five activity areas: Banking, Investing, Planning, Assets/Debt, and Reporting (see "Better Interface and Investment Tracking"). The tool bar at the top of the screen changes when you enter each activity area to show only the appropriate functions. You can still customize the buttons on the tool bar, and a nice backdrop feature hides the Mac desktop, preventing a stray click from dropping you into the Finder. Quicken remembers window positions in each activity area, so you can leave your frequently used windows open.

Data entry is easier and faster, while data-output features have received incremental, but still welcome, updates. A pop-up menu now lists your categories right in the check register, and you can sort registers by either date or check number. A new, small pop-up calendar available throughout the program lets you insert dates quickly. Reports now have print preview, and a Print to Fit feature fits your reports to the width of a page. Graphing has been improved with new display options, while EasyAnswer graphs quickly plot data based on your answers to common questions. And at long last, Quicken can memorize your custom graphs for easy reuse.

The multimedia help is greatly changed. Version 6's talking heads dispensing advice have been ditched in favor of terrific interactive financial planners for assistance with debt-reduction, networth, and retirement planning. These planners lead you through the various processes step-by-step, using your Quicken data as a basis.

The Check's in the Modem

Quicken 6 shipped without online banking, which lets you download statements from your checking, savings, and credit card accounts, and electronically transfer funds between them. An update added the feature in mid-1996, and Quicken 7 cleans up the online banking interface and makes it easier to use.



Better Interface and Investment Tracking Quicken 7's new interface separates the program's areas and reduces clutter on the tool bar. The improved investment window shown here displays the security's graph, and can show you prices or transactions with a single click of the mouse.

Quicken 7 finally brings the Mac to parity with Windows in terms of online bill payment. The program allows electronic bill payment directly through participating financial institutions (Intuit's Web site lists 38) or online payment through Intuit Services. Here's how it works. If the payee of your check can accept electronic fund transfers (EFTs), your payment is debited from your account and deposited into the payee's. If the payee can't take EFTs, the online payment center prints a paper check with your account number on it and sends it by mail or overnight courier. The setup required a couple of phone calls to my bank, an online sign-up with Intuit, and a wait of about a week until my bank mailed my password and sign-up kit. After that, it was a breeze to download statements and make payments—and I didn't need to find stamps or go to the post office.

The investment module shows further refinement with the addition of high, low, and close price tracking, as well as trading volume; handling of security lots; more-detailed information on history; and improved price graphing. You can target prices for a security, with Quicken alerting you when the security hits the high or low targets. And you can now get security quotes over the Internet.

There are also some miscellaneous changes for the better in Quicken 7. Intuit brought back the printed manual this year, a big improvement over last year's on-screen documentation. The already excellent Apple Guide has been beefed up. The home inventory program is still lame (and a prime candidate for a rewrite), but it's marginally easier to use.

A few Quicken 7 bugs have come to light. Stock splits can sometimes make your portfolio appear to have a negative number of shares, and the program uses different methods of calculating the return on investment (ROI) in its Portfolio window and its ROI report. In effect, the Portfolio window can underreport the performance of an investment compared with the performance as listed in sources like newspapers. An Intuit spokesperson said an updater that solves these problems should be posted on Intuit's online forums by press time.

The Last Word

Quicken Deluxe 7 is still the best personal financial software available on the Macintosh, and it's now easier for first-timers to use, with no cutback in features for the advanced user. If you want to gain control of your finances (and who doesn't?), Quicken is the best tool for the job.—TOM NEGRINO

RATING: ★★★★/8.7 **PROS:** Easier to use; good online banking and bill payment; improved investment features; nice interactive financial planners. **CONS:** A few bugs; poor home inventory program. **COMPANY:** Intuit (520/295-3220, *http://www.intuit.com*). **LIST PRICE:** $59.95.


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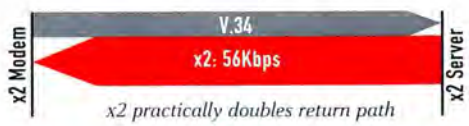
makes x2 possible. x2 takes advantage of the typical network configuration found when an analog subscriber connects to a digitally connected server. Because it bypasses the analog-to-digital conversion in the downstream path, x2 can use nearly all of the available 64K network bandwidth.



x2 takes advantage of the highly digital phone network.

(Upstream data, typically less speed sensitive, travels at the standard V.34 rate.)

The result is a completely new kind of transmission technique. Based on



x2 practically doubles return path

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It's a new

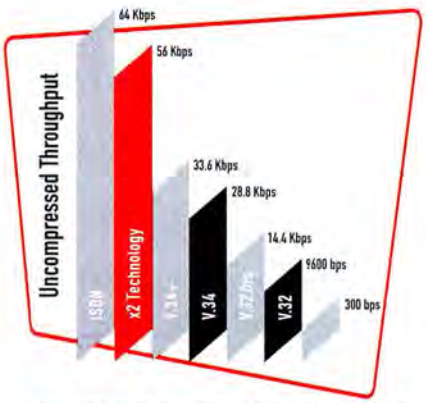
on both the server and end-user sides. This is important, since a communication technology must be in place on both ends of the connection to work properly for you.

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U.S. Robotics Total Control™ Enterprise Network Hubs are widely used by Internet service providers, corporate sites, and online services. Our Megahertz® brand is the leading choice for mobile users. And more people choose Sportster® modems than any other desktop brand. All told, no company puts more communication power into the hands of more people throughout the world than U.S. Robotics.

x2 technology is being supported by nearly 40 industry leaders worldwide. These include:

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Comparison of actual line throughput speeds.

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As the first company to bring you 14.4K, 28.8K/V.34 and 33.6K technology, U.S. Robotics is the leader in blazing the trail toward faster standards. In fact, we've already submitted x2 to the ITU-T board, and expect it to become the standard of the future.

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Sportster, the world's #1 selling modem, is now shipping in an easily upgradable version, and has been since August, 1996.

Our Total Control™ NETServer, MP and Courier™ products are flash ROM upgradable, with no extra equipment to buy.

And our Megahertz PC Cards will be x2-capable beginning in the first quarter of 1997.

Whatever your needs, you know they'll be met at incredible speed–and a reasonable price–whenever you see the x2 logo.

kind of technology.

Supported By Major Internet Service Providers

America Online, CompuServe, and MCI are just some of the nearly 40 ISPs worldwide that are implementing x2™ in their access servers. With such overwhelming support, x2 will become the technology of choice for anyone who wants the very fastest in online connections.

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x2 has been embraced by every sector of the communications industry, including major retailers, chipset makers, and original equipment manufacturers. This widespread acceptance ensures that x2 will be available to you on a variety of platforms, both now and in the future.



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NETCOM™

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While x2 Technology's 56K speed gives you the whole picture.

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x2 can cut the time you spend waiting for downloads nearly in half. You'll spend more time surfing, and less time waiting.

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SOHO Systems

NEW OFFERINGS DON'T LIVE UP TO POWERBASE SERIES

AT LAST THERE'S A SIGNIFICANT variety of small-office/home-office Mac OS systems. Motorola Computer Group has finally shipped the StarMax 3000 line, and Umax has released three of its long-awaited entry-level units. Alas, these low-cost systems weren't worth the wait. Power Computing's PowerBase series still offers the best choice in this category, thanks to better features and competitive prices (see *Reviews*, January 1997).

Motorola's StarMax 3000 series—two minitowers and two desktop models, known respectively as the MT603e and DT603e—suffers from the same limitations as its StarMax 4000 cousin (see *Reviews* in this issue): sparse RAM expandability (three slots), nonupgradable CPUs, and a lack of internal SCSI or secondary EIDE controllers for connecting extra internal drives. The lack of drive connectors is particularly galling on the tower models, which have three free drive bays (compared with the desktops' single free bay). Fortunately, the tower models come with five PCI slots (where the desktop has three), so there's plenty of room to add a SCSI card.



KEVIN CANDLAND

SuperMac C600 (left) and StarMax 3000

The Umax C600 towers offer an internal SCSI bus and an upgradable CPU. Unfortunately, the C600 has just two free drive bays, and two DIMM slots. The C600 comes equipped with a skimpy 1MB of VRAM, and—because the C600 is based on Apple's Performa 6400 motherboard—you can't expand it without adding a card. (The StarMax 3000 also comes with just 1MB of VRAM, but is expandable to 4MB.) Using the Performa 6400 design does offer one advantage: a communications slot, where Umax installs a Global Village 28.8-Kbps internal modem. The C600's nicest touch, though, is its front-mounted speaker jack.

Both the C600 and the StarMax 3000 systems perform as fast as their same-speed PowerBase counterparts, offering real performance, not the compromise speeds of previous entry-level Macs (see "SOHO Systems Run Neck and Neck").

The Last Word

The speed differences among vendors' offerings aren't great (except for Apple's systems, which are noticeably slower). Based on system design and features, there's no question that the PowerBase is still the best SOHO Mac. Despite their aggressive pricing, you simply don't get as much with a StarMax 3000 or SuperMac C600. If I had to choose between them, I'd pick the C600, but I'd really want a PowerBase.—GALEN GRUMAN

StarMax 3000 Series

STARMAX 3000 DT603E-160 ★★★/5.7

STARMAX 3000 DT603E-200 ★★★/6.0

STARMAX 3000 MT603E-160 ★★★/5.5

STARMAX 3000 MT603E-200 ★★★/5.8

PROS: Inexpensive; strong performance; external 28.8-Kbps modem. **CONS:** Nonupgradable CPU; limited RAM expansion; no internal drive connectors or VGA-to-Mac video adapter. **COMPANY:** Motorola Computer Group (800/759-1107, *http://www.mot.com/computer/*). **COMPANY'S ESTIMATED PRICES:** DT603e-160 $1595; DT603e-200 $1995; MT603e-160 $1895; MT603e-200 $2195.

SuperMac C600 Series

SUPERMAC C600/180 ★★★/6.2

SUPERMAC C600/200 ★★★/6.2

SUPERMAC C600/240 ★★★/6.5

PROS: Strong performance; good expandability; front-mounted headphone jack; internal 28.8-Kbps modem. **CONS:** Limited RAM and VRAM expansion. **COMPANY:** Umax Computer (510/226-6886, *http://www.supermac.com*). **COMPANY'S ESTIMATED PRICES:** C600/180 $1695; C600/200 $1995; C600/240 $2295.

MW LAB

SOHO Systems Run Neck and Neck

Longer bars are better. Results are times as fast as a Centris 650 (Centris 650 = 1.0). Products are listed in order of overall performance. Boldface indicates products reviewed here.

	Overall Score	CPU-Intensive	FPU-Intensive	Disk-Intensive
Power Computing PowerBase 240	6.4	6.5	9.1	2.5
Umax SuperMac C600/240	6.3	6.3	9.0	2.8
Motorola StarMax 3000 MT603e-200 *	5.8	6.0	7.9	2.4
Umax SuperMac C600/200	5.8	5.9	8.0	2.7
Power Computing PowerBase 200	5.8	6.0	8.0	2.4
Power Computing PowerBase 180	5.4	5.6	7.5	2.3
Umax SuperMac C600/180	5.2	5.3	7.3	2.1
Motorola StarMax 3000 MT603e-160 *	5.1	5.3	6.8	2.3
Apple Power Macintosh 6400/200	4.5	4.7	5.7	2.1
Apple Performa 6400/180	4.0	4.1	5.2	2.0

** Times shown for minitower configuration; times for desktop models were statistically similar.*

Behind Our Tests For details on our methodology, see *Mac Superguide*, January 1997.—**Macworld Lab testing supervised by Mark Hurlow**

Programmable Trackballs

TURBO MOUSE ROLLS PAST STINGRAY, TRACKMAN MARBLE

MANY PEOPLE CHOOSE A POINTING device the same way they buy RAM: they base their decision mainly on price. But if you look beneath the surface, the cheapest deal isn't always the best buy. Three recently released programmable trackballs bear assessing based on their features as well as their prices.

The Hand That Fits You

Kensington Microware's Turbo Mouse is the most conventional-looking device of the bunch, with a large, sloping case and a generous, centrally located ball. The trackball is flanked by four easy-to-press programmable buttons, although people with small hands may have trouble reaching over the ball to get at the two farthest buttons. The Turbo Mouse comes with a detachable ADB cord, and a second jack on the case lets you keep a keyboard or another pointing device, such as a graphics tablet or conventional mouse (for those who share a Mac but not peripherals), attached to your system.

Like its aquatic namesake, the CoStar Stingray 4.0 sports a broad, low-profile shape, with two enormous buttons and a small ball. The buttons are so big that they're easy to find without looking, but they offer a bit too much resistance for my taste. Of these three trackballs, the Stingray is the only one that works with its cable facing toward you, away from you, or to the side; you use a control panel to set the orientation you prefer. Like the Turbo Mouse, the Stingray provides a spare plug for an extra ADB device, but because the plug is located at the end of the Stingray's cable, it's not as convenient.

Logitech's TrackMan Marble has the most restrictive design of the three: you rest your right palm on the case (southpaws can't use it), while your thumb operates the trackball and your middle fingers work the three buttons. Ergonomically, this layout has drawbacks, but the TrackMan Marble's curved shape makes it a comfortable hand rest, and you don't have to move your arm to roll the ball. I found it more awkward to move my thumb up and down than sideways, and I found it hard to distinguish the buttons by touch, so I couldn't click without glancing down. And unlike its competition, the TrackMan Marble lacks a second ADB jack.

Buttons and Shortcuts

All three trackballs' software lets you program their buttons to perform all sorts of effort-reducing tasks. Logitech's MouseKey is the least comprehensive of the utilities. The control panel lets you adjust cursor tracking and double-click speed, and an option called Smart Move automatically centers the pointer on the default button of any dialog box. You can program the buttons for up to three clicks, click lock, or simple keyboard shortcuts like shift-option-P. The software also lets you customize button assignments by application, so buttons can perform different functions in, say, Microsoft Word than they do in Claris FileMaker Pro.



ROBERT PERRY

Clockwise from left, the Turbo Mouse, Stingray, and TrackMan Marble

The Stingray control panel goes one step further, letting you customize button functions for different users, a boon if you share your Mac. (Although the Stingray has only two buttons, you can program them to respond when you press both at the same time, in effect adding a third, virtual button.) The Stingray's software also gives you more control over cursor response than the TrackMan's. For instance, you can change tracking sensitivity or constrain the cursor's traveling direction by pressing a button.

MouseWorks 5.0 is a new release of the application that's been shipping with Kensington's mice and trackballs for several years (see "Smart Input," May 1996). It was already the best pointing-device software around, and version 5.0 is even easier to use, with separate panels for customizing cursor acceleration, button functions, click speed, and cursor movement. (If you have MouseWorks 4.1 or later, you can download the new version from Kensington's Web site for free.)

MouseWorks provides a dizzying array of programming options, all thoroughly covered in the comprehensive manual, which also includes a welcome section on workspace ergonomics. One of my favorite functions is the ability to create application-specific pop-up menus of shortcuts, so you don't have to remember which button does what. MouseWorks also lets you program longer keystroke sequences than either CoStar's or Logitech's software—511 characters, as opposed to just 3 or 4.

The Last Word

Only you can decide if a pointing device is right for your body and the way you work, but Kensington's MouseWorks software should put the Turbo Mouse at the top of everybody's short list of trackballs to consider.—FRANKLIN TESSLER

Stingray 4.0

RATING: ★★★/5.5 **PROS:** Large buttons; works facing in any direction; can be configured for multiple users. **CONS:** Hard-to-press buttons; limited programmability. **COMPANY:** CoStar (203/661-9700, *http://www.costar.com*). **COMPANY'S ESTIMATED PRICE:** $55.

TrackMan Marble

RATING: ★★★/5.2 **PROS:** Very comfortable. **CONS:** Thumb-operated ball; difficult to distinguish buttons by feel; limited programmability; can't use with left hand. **COMPANY:** Logitech (510/795-8500, *http://www.logitech.com*). **COMPANY'S ESTIMATED PRICE:** $99.

Turbo Mouse 5.0

RATING: ★★★★/8.5 **PROS:** Excellent programming software. **CONS:** Farthest buttons hard to reach. **COMPANY:** Kensington Microware (415/572-2700, *http://www.kensington.com*). **COMPANY'S ESTIMATED PRICE:** $110.

Macworld says

GOTTA HAVE IT

The Mac OS ought to work this way.

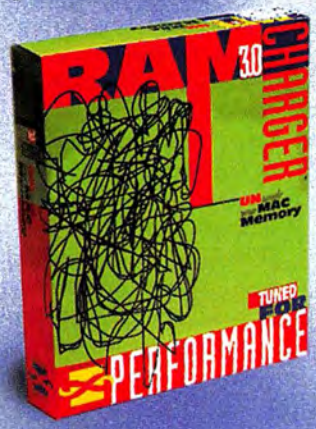
Reviews, July 1995

Until it does, there's

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Detailer

NATURAL-MEDIA PAINTING COMES TO 3-D

CREATING REALISTIC-LOOKING surfaces on 3-D models can be a cumbersome process of navigating dialog boxes, manipulating variables for texturing and imaging effects, and waiting for test renderings to preview the results. Haven't you ever wished you could just grab a model and paint directly on it? Fractal Design's Detailer, a new paint program for 3-D models, lets you do just that.

With Detailer, not only can you brush image maps onto the surface of 3-D models, but you can also apply and edit maps controlling bumpiness, highlights, environment reflections, and glowing effects. When you're done, Detailer either renders an image of the model that's ready for compositing in a 2-D background or exports the painted model for use in a 3-D scene or animation.

Impressive Imaging

Detailer displays the 3-D model in its own window; you can rotate the model in any direction and select individual parts of multiobject models. Each image map is displayed in its own 2-D window, and every object can have its own collection of maps. Before you can paint an object, you must apply a texture map; other maps, such as Bump and Glow, are optional. Detailer offers five mapping types—cylindrical, spherical, pass-through, cubical, and implicit—so you can tailor the map to the object. You can paint on either the 3-D object or the 2-D image, and the views update automatically in near real time.

Although Detailer works with 3-D models, it feels like a 2-D program. If you're familiar with Fractal Design's Painter, you'll have no difficulty getting up to speed; Detailer's interface is almost identical to Painter's, and most of Painter's natural-media tools appear in Detailer's Brush palette (see "Making an Impression"). Detailer isn't hard to use, but it does have a learning curve. Those who aren't familiar with Painter will need to turn to the manual more frequently. Fortunately, it's a well-organized, clearly written, comprehensive reference.

Like Painter, Detailer supports image floaters and Adobe Photoshop layers, managing them with the Floater List palette. The Light subpalette on Detailer's Materials palette lets you adjust the lighting in the model view for both editing and rendering. In the Object subpalette you can see the status of the various maps associated with the selected object and adjust the effect with sliders—to change the degree of reflectivity or the amount of bumpiness, for example.

Although Detailer's focus is painting on models, it can also be used as an independent texture generator, producing image maps in the 2-D windows before the models are finalized. You can do the same thing in standard paint programs, but with Detailer you can test the results immediately. Applying the image maps to Detailer's built-in object primitives allows you to see how textures will look under 3-D lighting conditions and lets you manipulate the image maps to produce different texture variations, all without a formal model.



Making an Impression To produce the effect of built-up paint, I used Detailer's Impressionist brush to apply both a Texture Map and a Bump Map.

Detailer produces competent, high-resolution 2-D renderings of the view in the model window; you simply position the model, adjust the lighting, and go. Renderings include an alpha-channel mask, and both the image and the mask can be antialiased for versatile compositing.

Detailer can import and export images in RIFF, TIFF, PICT, BMP, JPEG, and Photoshop formats. It imports and exports models only in 3DMF (QuickDraw 3D) and its own native format, as well as importing in DXF, though plug-ins supporting other formats should be available soon. Detailer's object primitives are suitable only for simple images, but the CD includes 100 image textures, 100 pattern textures, 120 photos, 100 brushes, and an assortment of simple but useful models. Also included is Ray Dream Designer 4.1.2, which exports files in Detailer format so you can start building models right away.

Impressive Requirements

Detailer can handle models containing as many as 240 objects, but RAM and performance considerations set a lower practical limit. To start with, a 400-by-400-pixel model-window image requires about 8MB of RAM. In addition, every map applied to an object—up to five per object—has its own RAM requirements commensurate with its resolution. Multiply that by the number of objects, and a complex model can eat up memory fast. And that doesn't include the RAM set aside for Detailer's user-definable undo function. You'll want a system with at least 40MB of RAM, but if you can afford more, get it.

Then there's performance. The more intricate the model and the more complex the imagery, the larger the computational hit. Depending on your Mac, Detailer may slow down and lose the immediacy of real-time feedback, its most compelling feature. In most cases, you'll probably want to paint complex models as subassemblies. Performance was acceptable on my 7100/80, but Detailer will probably send 3-D design pros scurrying for 604-based multiprocessor Macs. This isn't a criticism; Detailer simply pushes the imaging envelope.

The Last Word

Detailer is a wonderful imaging tool. Artists will admire its dexterity at incorporating 3-D elements into 2-D artwork; animators and industrial designers will love the ability to paint directly on 3-D objects. Like Painter and Photoshop, Detailer is destined to become a graphic-arts staple.—CARLOS DOMINGO MARTINEZ

RATING: ★★★★/8.9 **PROS:** Paints directly on 3-D models; excellent tools for natural-media painting and creating image textures. **CONS:** Voracious appetite for RAM; long learning curve. **COMPANY:** Fractal Design (408/430-4000, *http://www.fractal.com*). **LIST PRICE:** $449.

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MW EDITORS' CHOICE

MacUser RATED SEPTEMBER 1996

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Multimedia Authoring Tools

MTROPOLIS AND CLICKWORKS OFFER POWER WITHOUT PROGRAMMING

MACROMEDIA DIRECTOR'S WELL-rounded development features have made it the most popular high-end multimedia authoring program, but its formidable learning curve and reliance on scripting have caused multimedia authors to cry in their cappuccinos (see *Reviews*, July 1996). Two new challengers, mFactory's mTropolis 1.1 and Pitango's ClickWorks 1.0.2, take a different approach to authoring. Both eschew scripting in favor of straightforward dialog boxes that let you specify events and actions, but mTropolis is a heavy-duty development tool (it offers a scripting language for advanced tasks), while ClickWorks is more adept at integrating Web content.

Media and Structure

Like all authoring programs, mTropolis and ClickWorks let you import media elements—text, graphics, sound, QuickTime movies—and combine them into an interactive production. Both use media windows to let you import and manage a project's elements, but ClickWorks imports a broader array of graphics and sound formats; mTropolis is limited to PICT graphics and AIFF sounds.

Both programs break a production down into screens, called *scenes* in mTropolis; you design screens by dragging imported media elements into them. mTropolis's hierarchical approach to project structure makes large, complex efforts easier to manage than ClickWorks', whose screens appear in a flowchartlike window that can quickly become a tangle of interconnected objects.

Neither ClickWorks nor mTropolis has Director 5's ambitious screen-layout features, such as built-in painting and word processing windows. mTropolis's text capabilities are particularly weak: you can format text, but you can't specify line spacing, indents, or antialiasing. ClickWorks supports antialiasing, kerning, leading, paragraph indents, and tabs, and can import formatted text. It's definitely the better program for text-intensive productions. But mTropolis has the edge when it comes to custom color palettes, letting you import color palettes and switch between them. ClickWorks doesn't support them, a serious limitation if your projects are destined for 256-color displays.

Being Interactive

The sharpest contrast between Director and both ClickWorks and mTropolis involves interactivity. In Director, you have to write scripts to create clickable buttons that play movies or branch to other screens; ClickWorks and mTropolis reduce the task to a few mouse clicks.

mTropolis relies on a collection of palettes containing modifier icons, each representing a specific function—starting a QuickTime movie, for example (see "Downtown mTropolis"). This approach is not only simple, it's exceptionally powerful. mTropolis makes it easy to apply the modifiers you create for one object to other objects—even in other projects, cutting development time dramatically.

ClickWorks doesn't offer reusable behaviors, but it makes it easy to add interactivity to a project. An Events palette contains a list of elements in the project, a list of events (such as mouse down and mouse up), and some pop-up menus. You create an action by selecting an element, then selecting an event, then specifying what should take place when that event happens to that element (see "Working in ClickWorks"). This scheme is flexible enough for almost any task, but it has one glaring weakness: you can't easily reorganize events and actions.

House Specialties

One of mTropolis's unique features is an animation format called mToon that lets you create animated objects. You can apply mTropolis behaviors to mToons to create seemingly intelligent characters, such as a bird that always flies away when the mouse pointer approaches it.

mTropolis is also the best authoring program for projects containing QuickTime VR panoramic movies. Using QuickTime VR in Director is a brain-bending exercise; in mTropolis, it takes a couple of mouse clicks. And mTropolis lets you use modifiers to control panning, zooming, and node navigation.

ClickWorks can't play QuickTime VR movies at all, but it has its share of unique talents, such as extensibility and the option to add search features to a project. One of the included plug-ins supports an Apple QuickTake 150 digital camera and lets you add QuickTake images to a project (or even allow end users to do so); another works with Apple's Speech Manager to provide text-to-speech support. But the most exciting plug-in, WebLink, retrieves text or graphics from a Web site. Draw a box and enter an URL for a file, and ClickWorks retrieves and displays the element. Best of all, because you can specify that the element be updated when a certain event occurs, you can create a project with up-to-the-minute timeliness—a sports CD-ROM with a screen that displays the latest standings, for example. No other authoring program provides such an easy link to the Web.

mTropolis does have some noteworthy Internet-oriented features. An experimental (read: unsupported) modifier lets you send messages to other mTropolis projects across a network, enabling multi-



Downtown mTropolis In mTropolis, you specify object behaviors by dragging modifiers from the palettes (at right) to the objects they modify.



Working in ClickWorks ClickWorks' Events window lets you specify events that cause a movie to play back when the user clicks on it.

user games. And a Netscape plug-in called mPire lets Web-based mTropolis projects play back within Navigator.

When it's time to build the final product, mTropolis is well ahead of ClickWorks. It lets you save a project as a read-only file, which you can distribute along with a royalty-free player that runs under the Mac OS, Windows 95, or Windows 3.1; a variety of memory-management and performance-optimizing features lets you fine-tune the project. ClickWorks uses a similar player arrangement, but it lacks mTropolis's performance-tuning features. And while Pitango promises to support cross-platform development, it has yet to ship a Windows player.

mTropolis's documentation is superior to ClickWorks', and the CD-ROM also includes several excellent tutorials that you can take apart and learn from. mTropolis also has the edge in stability: in my tests, ClickWorks crashed occasionally.

The Last Word

mTropolis is a more sophisticated authoring environment aimed at major-league title developers. For game development and projects containing QuickTime VR movies, it's a terrific tool—and an excellent alternative to Director.

ClickWorks is more an extremely accomplished presentation program than a multimedia development tool, but it's a solid choice for corporate or kiosk developers, educators, seasoned presenters who want to go beyond Microsoft PowerPoint or Adobe Persuasion, and anyone who wants to integrate Web content effortlessly into a project.—JIM HEID

ClickWorks 1.0.2

RATING: ★★★/6.8 **PROS:** Straightforward interface; excellent Web integration. **CONS:** Can't create stand-alone applications; no Windows player. **COMPANY:** Pitango (617/280-7163, *http://www.pitango.com*). **LIST PRICE:** $985.

mTropolis 1.1

RATING: ★★★★/7.3 **PROS:** Elegant interface; object-oriented approach; excellent performance-optimizing features; superb QuickTime VR support. **CONS:** Weak text support. **COMPANY:** mFactory (415/548-0600, *http://www.mfactory.com*). **LIST PRICE:** $1195.



After Dark 4.0

GLITZIER, BUT NOT NECESSARILY BETTER

NO MATTER WHAT THE BOX SAYS, After Dark isn't really a screen saver. Years ago, monitors that were left unattended could develop a burned-in image; but you'd have to leave their present-day successors on for *years* before you'd see burn-in. Indeed, many of After Dark's modules illuminate your entire screen continuously, theoretically hastening another kind of damage: the gradual exhaustion of the phosphors on the glass.

So if After Dark doesn't save your screen, what's it for? In version 4, Berkeley Systems makes this non–screen saver meaningful in two ways: by boosting the entertainment value and by creating an Internet link that parades recent news, current stock prices, and vitally important sports scores across your screen.

Some of the control panel's 22 displays are recognizable from previous editions: you'll see the familiar flying toasters, the ubiquitous tropical fish aquarium, and the mischievous dog that makes a mess of your desktop, though these older



A Slicker Ticker If a news item or advertisement catches your fancy, you can click on it to connect to the Internet and read more about it.

modules have been re-created using 3-D modeling software to match the look of the newer ones. The 3-D–ized toasters, fish, and other characters look more realistic, though often less charming, than their forerunners. (The full set consumes a ridiculous 35MB of drive space, so you're best off picking the ones you like and deleting those you won't use.)

The best of the new modules includes Hula Twins, two pigtailed 3-D girls who try to outdo each other with increasingly hilarious hula hoop tricks; Rock Paper Scissors, a 3-D animated Ninja-movie version of the children's game; and Messages, in which the fingertip of a realistic, life-size hand appears to write your chosen message on the inside of the fogged-up glass. After Dark also includes Rodger Dodger, a Pac-Man–style game, and Magic Turtle, a visual programming language. Unfortunately, neither the instruction booklet nor the on-disk manual sheds any light on individual modules.

The other new attraction, called After Dark Online, is modeled on the free, real-time Internet news ticker from PointCast. (If you're interested in getting just this online component, without the new screen-saver modules, it's available free from Berkeley Systems' Web site.) To make it work, you must have an Internet connection (an AT&T starter kit is included).

At specified intervals, After Dark links to the *USA Today*, *Sports Illustrated*, ZD Net, and DBC Financial News sites on the Internet and loads itself with information. (An additional $50 a year gets you the *Wall Street Journal*.) Whenever After Dark kicks in, it displays this info as text, pictures, scrolling tickers, or graphs. Unfortunately, annoying advertising consumes a third of your screen, the news itself is superficial, and bugs lurk (including chopped-off text and "URL not found" messages). Clearly, the advertisements subsidize the free version—but why should purchasers also have to endure the ads?

The Last Word

If you already own After Dark 3, the handful of nifty new modules are the sole reason to upgrade—After Dark's password-protection option, desktop-filling picture, and monitor-power features are unchanged from the previous version, and the online component is available for free. After Dark's role as a screen saver is mostly irrelevant, and its success as a news vehicle is underwhelming, but this version performs its lighthearted entertainment tasks better than ever.—DAVID POGUE

RATING: ★★★/6.7 **PROS:** Clever new modules; password and desktop features. **CONS:** Sparse documentation; ad-filled online news; available only on CD. **COMPANY:** Berkeley Systems (510/540-5535, *http://www.berksys.com*). **LIST PRICE:** Basic version $30; deluxe version (includes previous versions' modules) $40.

CodeWarrior 10 Gold

MAC PROGRAMMING ENVIRONMENT TAKES BACK THE LEAD

METROWERKS' CODEWARRIOR 10 Gold is a big, complete new package with a revamped, Copland-style integrated development environment (IDE 1.7), useful browser improvements, a more complete Java feature set, and a better generation of Windows target code. This single environment has compilers for C/C++, Pascal, and Java, and the compiled code runs not only on the expected 680X0 and PowerPC systems, but also on



New Look, New Content CodeWarrior 10's new look complements its updated Java tools. AppleScript commands are now organized in their own menu, too.

those systems running Magic Cap, Windows 95 and NT, PowerTV, the Be OS, and the MIPS processor chip.

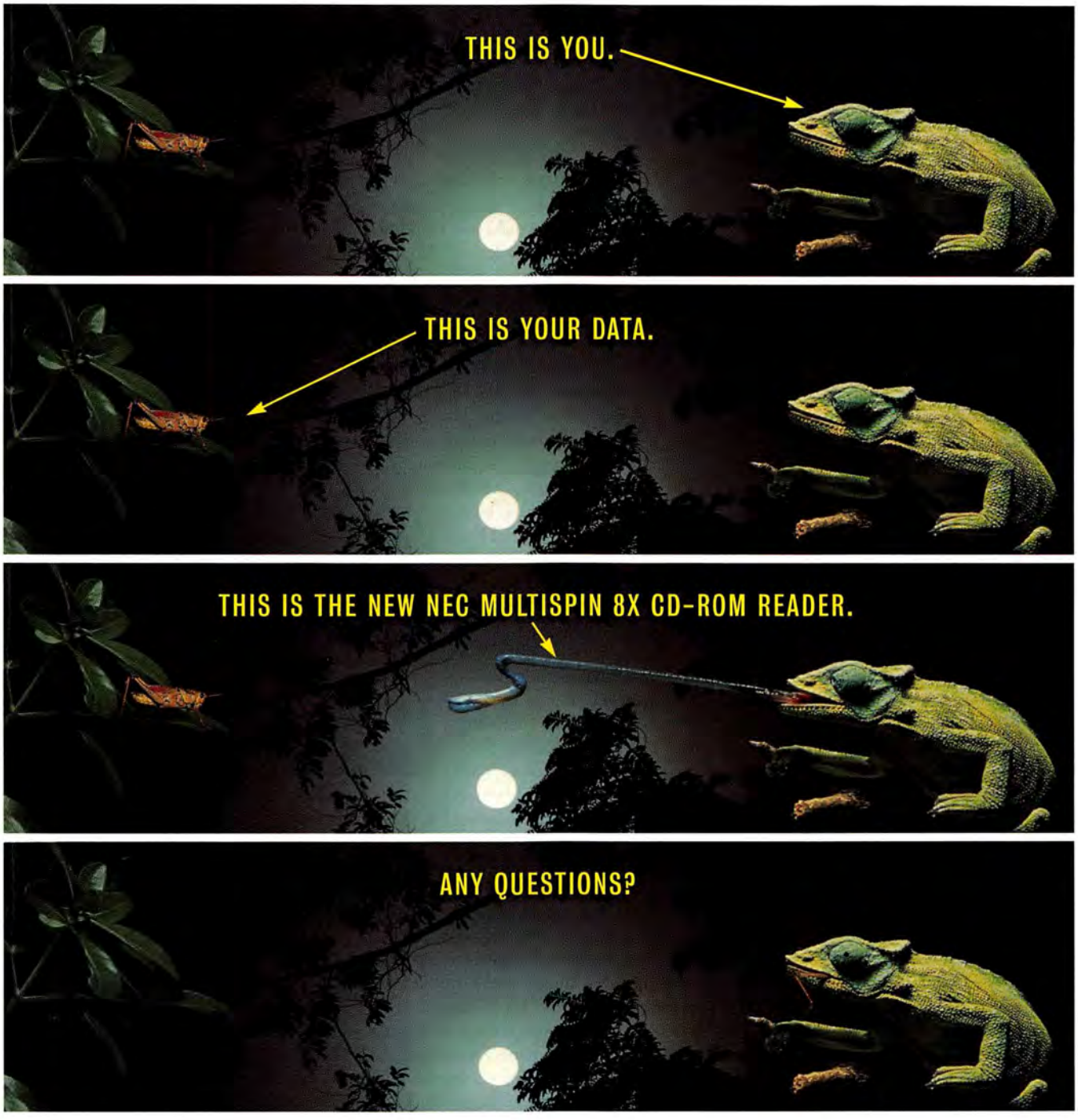
IDE 1.7 has an impressive collection of new touches. The browser now lets you inspect classes by calling up a menu with a simple click on terms in the source code. The PowerPlant class library finally has classes to help you develop Internet applications quickly. And AppleScript, a useful tool for automating routines that involve file handling, has been integrated into CodeWarrior's menus.

Java Sweetened a Bit

Metrowerks' first Java effort, Discover Programming with Java, was a plain implementation of Sun's first Java development kit (JDK). CodeWarrior 10, which uses Sun's more stable JDK 1.02, is still relatively drab compared with Symantec's Visual Cafe; on the other hand, everything *works*.

A Java utility called Code Wrangler lets you open, read, and copy the Web's ubiquitous Java zip files without stepping out of the IDE to do it with stand-alone

continues





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utilities. The IDE disassembler now works on Java as well as traditional languages. The Metrowerks Constructor has been adapted to Java and offers simple visual development of applet interface features; it's not as gee-whiz as Visual Cafe, but it's helpful and thoroughly debugged. A separate applet viewer—notably absent from CodeWarrior 9—is included. And the debugger now treats Java and C++ as equals (Java debugging in CodeWarrior 9 hadn't been properly integrated into the IDE). One feature missing from CodeWarrior 10, support for the new multiprocessing Macs, should be included in the next release.

Some Problems and a Solution

Problems are unavoidable in a product this size; a minimal installation with a few of the included online books takes you to 100MB. Much of this bulk is caused by an insane level of redundancy: the same Java applets appear in folder after folder of books, documentation, examples, and tutorials, and you won't believe the number of identical "hello, world!" programs that pile up in the CodeWarrior folder. A more annoying point is that you have to do a very diligent uninstall of CodeWarrior 9 or face a variety of mystery errors. The new release also has an assortment of bugs, most often associated, ironically, with the debugger.

Fortunately, CodeWarrior includes a utility for Web-posted fixes and updates; technical support is amazingly responsive; and you get several excellent online books—including Dave Mark's *Learn C on the Macintosh* and Barry Boone's *Learn Java on the Macintosh*—as well as Sun's and Metrowerks' Java documentation.

The Last Word

Metrowerks has a big lead in the Mac programming market, mainly because it's a Mac-first operation, it's devoted exclusively to developer tools, and it listens to its users. After a few less-than-stellar releases, version 10 puts CodeWarrior solidly back in the lead.—CHARLES SEITER

RATING: ★★★★/8.3 **PROS:** Stunningly complete; competitive Java development environment; phenomenal online support. **CONS:** Upgrade problems; slow interface elements; assorted bugs. **COMPANY:** Metrowerks (512/873-4700, *http://www.metrowerks.com*). **LIST PRICE:** $399.

Executor 2

MAC-ON-PC EMULATOR FALLS SHORT

FOR MORE THAN A DECADE, PEOPLE have speculated that a PC port of the Mac OS would put Windows on its deathbed. Today, although slaying the Microsoft giant is perhaps unrealistic, porting the OS to run on Intel chips could still help the Mac platform grow.

In this spirit, Abacus Research & Development, Inc. (ARDI), has taken on the quixotic goal of writing an emulator designed to let PCs run Mac programs—without Apple's support or blessing. (To accomplish this task, ARDI used a process known as clean-room reverse engineering: it claims to have rewritten basic OS services from scratch, without using any of Apple's ROM or OS code.)

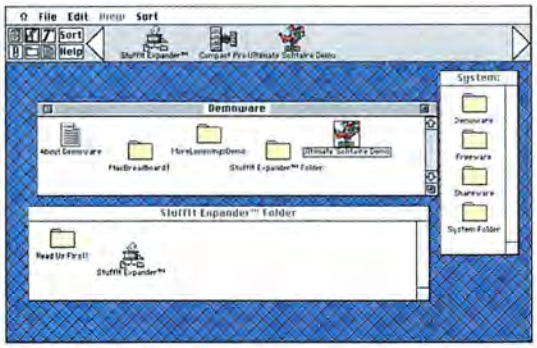
As much as I would like to say that Executor 2 is a success, it isn't—not by a long shot. Its functionality is extremely limited, and it's unreliable.

Executor's limitations are many. The most notable shortcomings are a lack of support for basic OS components like extensions, control panels, and Apple menu items; an inability to select more than one file at a time; a lack of support for PowerPC-native programs; limited support for System 7 (Executor emulates System 6.0.X); limited sound support; and a lack of support for AppleTalk and serial ports—you can't use a modem or printer with Executor. It uses a nonstandard interface that shares a few similarities with the Mac OS (see "Mac Impostor"). Its numerous differences—such as a gray band at the top of its desktop that is like a launcher for drives, files, and programs—aren't necessarily bad, just different.

You might be willing to accept these limitations if Executor were reliable, but it's not. On my 133MHz Pentium PC, Executor crashed constantly when attempting basic tasks like opening a CD-ROM or installing software to the hard disk. I was unable to actually install any Mac software on my PC—the few installer programs that would run aborted partway through when they tried to use a Mac function not implemented in Executor's emulation.

Making the installation even more challenging, most programs that ARDI says should work on Executor—those designed for System 6.0.7—come on 800K floppies, which no PC floppy drive can read. You could copy your System 6.0.7–compatible programs to 1.4MB floppies and *then* try to install them, but you have to ask whether all this trouble is worthwhile for hit-and-miss compatibility. I don't think it is, but ARDI offers a trial version of Executor on its Web site—you can decide for yourself.

I was able to use programs that came bundled with Executor—some Mac applications *will* run. Speedometer, a benchmarking utility, clocked Executor running on my Pentium 133 as being two-thirds as fast as a Power Mac 7500/100. Compared with SoftWindows 95—the program that runs Windows on a Mac—this is very good performance, although SoftWindows' full emulation is a much more difficult task (see *Reviews*, September 1996).



Mac Impostor Executor 2's interface duplicates many Finder functions. Unfortunately, its Mac support is limited and unreliable.

The Last Word

Sadly, Executor is really just a toy, and as such its $249 list price is prohibitive. As a substitute Mac, it looks like a real bargain at first glance, but the effort needed to use it isn't worth the savings. If you're truly cash-strapped, save a little longer and get one of the new inexpensive Mac OS systems. The reality is that if you want to use Mac software, you still need Mac hardware.—GALEN GRUMAN

RATING: ★/1.8 **PROS:** Can run some Mac programs on a PC; fairly speedy. **CONS:** Crashes often; cannot run most Mac software. **COMPANY:** Abacus Research & Development (505/766-9115, *http://www.ardi.com*). **LIST PRICE:** $249.

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Photoshop Add-Ons

PLUG-INS AND FILTERS ADD MORE OR LESS USEFUL EFFECTS TO PHOTOSHOP

EXTENDING AND ENHANCING Adobe Photoshop has become a thriving cottage industry for third-party developers. Three of the latest collections of plug-ins and filters—Chromatica, Power/Pac 1, and PhotoTools—take different approaches, with varying degrees of success.

Of the three, PhotoTools 1.0 from Extensis is the most polished. One of its plug-ins, PhotoText, lets you create and format text within Photoshop; others add glows, bevels, embossing, and drop shadows. With simple controls and large previews for fine-tuning the effects, all five yield excellent results. Another plug-in, PhotoBars, lets you customize Photoshop's interface with user-definable tool bars. You can create new buttons using the SmartBar feature, which tracks your actions in Photoshop and captures the sequence of commands as buttons on a floating palette. Unfortunately, these tool bars and palettes deposit blank areas in the image window. And while the Intellihance Lite color-correction filter is included, it works only on RGB images.

In contrast, Chroma Graphics' Chromatica focuses on only two tasks: masking and recoloring images. Its ChromaColor plug-in builds a mask based on the range of colors you select. The plug-in works best on a relatively narrow range of colors, but it does a good job of retaining subtle color variations. The other Chromatica plug-in, ChromaPalette, gives you access to more than 1000 color palettes. Although it produces some interesting effects, it's the less useful of the two plug-ins for day-to-day work.

Auto F/X's Power/Pac 1 is a collection of 12 macros that automate Photoshop functions. You can use it to produce imaging effects such as glows, embossing, recessing, focusing, and edge distortions; and it lets you draw clipping paths, select graphic elements, adjust color saturation, apply textures, and create shadow effects. The CD also contains more than 1700 graphic frames and textures. The modules essentially run themselves, but that automation is its weakness as well as its strength: Power/Pac locks you into a process until it's finished, and can alter the structure of your image by merging layers and changing their names. And unlike plug-ins, Power/Pac installs in the System Folder and uses an extension to mount its menu. This extension caused difficulties on my Macintosh, including making Painter's palettes go haywire.



Power Tools PhotoTools makes creating, formatting, and positioning text in Photoshop a snap (and it's a big improvement over Photoshop's Type tool).

The Last Word

Although Chromatica only masks and recolors images, its ability to replace a range of colors is handy. And while Power/Pac's approach can be restrictive, it offers some good-looking effects. Of the three, PhotoTools—with plug-ins for creating text, adding special effects, and customizing Photoshop—is the most useful.—CARLOS DOMINGO MARTINEZ

Chromatica

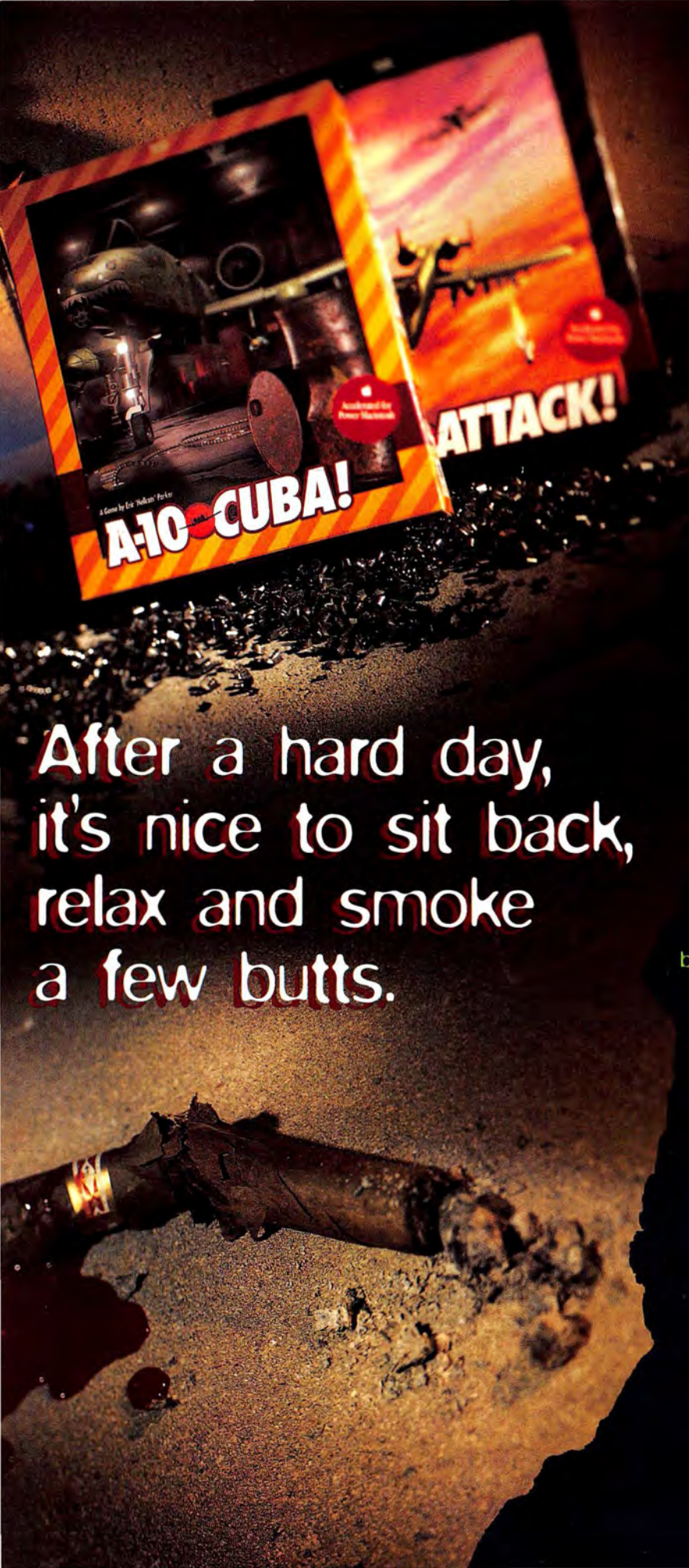
RATING: ★★/4.8 **PROS:** Easy image masking and recoloring. **CONS:** Works best on narrow color ranges. **COMPANY:** Chroma Graphics (415/375-1100, *http://www.chromagraphics.com*). **LIST PRICE:** $149.95.

PhotoTools 1.0

RATING: ★★★/5.7 **PROS:** Produces useful effects; customizes Photoshop. **CONS:** Color-correction filter is RGB only. **COMPANY:** Extensis (503/274-2020, *http://www.extensis.com*). **COMPANY'S ESTIMATED PRICE:** $99.95.

Power/Pac 1

RATING: ★★/4.4 **PROS:** Good selection of special effects. **CONS:** Automated approach can be restrictive. **COMPANY:** Auto F/X (603/875-4400, *http://www.autofx.com*). **LIST PRICE:** $249.



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Inside Apple

Be, Apple Deal Remains Stalled

Power Computing deal doesn't persuade Apple

Even though Be announced today that it will license its Be OS operating system to Mac-maker Power Computing, industry observers say Apple Computer is no closer to a deal with Be than it has been in the last few months. more

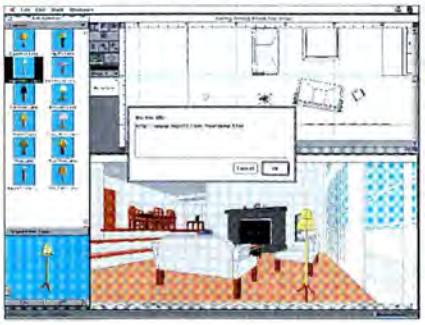
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3-D Website Builder

VRML AUTHORING PROGRAM IS STRAIGHTFORWARD BUT LIMITED

VIRTUAL WORLDS MAY EXIST IN the ether of electrons, but you still need physical tools to build them. With 3-D Website Builder from Virtus, you can create worlds using Virtual Reality Modeling Language (VRML), the Web's platform-independent language for describing 3-D rendered spaces (see "Face-to-Face Online," January 1997). 3-D Website Builder is designed to make VRML authoring easy, even for people with no experience in 3-D modeling. By and large it achieves that goal, but it has some limitations.



Inside-My-Home Page You can drag prebuilt models from the 3-D Galleries window (left) into the Design View window (upper right). The Walk View window (lower right) previews the scene. Here, a link anchor is being attached to the floor lamp.

Drag Yourself into 3-D

Like its older sibling, the $495 Walk-Through Pro (see *Reviews*, April 1995), 3-D Website Builder excels at creating navigable spaces. But it also makes scene modeling easier for 3-D newcomers, and it's Web savvy: you can attach URLs to objects and export models as VRML files. And by navigating your space with the Record command active, you can create simple animated walk-throughs and either play them back within 3-D Website Builder or export them as QuickTime movies.

3-D Website Builder's key strengths are its drag-and-drop approach to authoring and its 30MB library of canned models: furniture, figures, household objects, spaceships, and the ever-popular Viking weapons. These strengths are complementary in that a neophyte can create interesting 3-D worlds by dragging and dropping shapes from the program's 3-D Galleries window into the Design View window (see "Inside-My-Home Page"). The galleries would be more convenient if the program enabled you to switch between them on the fly; instead, you have to quit the program, copy the desired gallery files into specific folders, and launch 3-D Website Builder again.

The Web Angle

VRML lets you link objects in a scene to URLs—so visitors to your page can click on a vase to go to the page describing it, for example. 3-D Website Builder makes assigning these anchors a cinch: you simply select an object, choose Add VRML Anchor, and type in the URL.

One drawback is that 3-D Website Builder exports VRML 1.0 files; it doesn't support the greatly enhanced VRML 2.0 standard. (Virtus says VRML 2.0 support is planned for a future update.) If you want to develop VRML 2.0 models now, investigate Macromedia's Extreme 3D (*Reviews*, July 1996) or Paragraph's Virtual Home Space Builder 2.0, the Mac version of which should be available by the time you read this.

When you export to VRML, you can choose to export the model's textures in GIF or JPEG format. 3-D Website Builder doesn't support many of VRML's performance-optimizing techniques, however, such as the one that lets you specify that an object's details appear only when a visitor moves close to them.

3-D Website Builder arrives on a CD-ROM containing Mac OS, Windows 3.1, and Windows 95 versions of the program. The Mac version runs on both 680X0 and Power Macs, but it's slow on the former.

The Last Word

3-D Website Builder is a solid package for anyone who wants to test the VRML waters without delving into the technicalities of 3-D modeling. Serious VRML authors will want to look elsewhere, but beginners will find 3-D Website Builder's world a friendly one.—JIM HEID

RATING: ★★★/6.5 **PROS:** Simple drag-and-drop interface; large library of models. **CONS:** Cumbersome gallery management; no VRML 2.0 support; limited VRML-optimizing features. **COMPANY:** Virtus (919/467-9700, *http://www.virtus.com*). **LIST PRICE:** $159.

New FreeHand™ Graphics Studio™ 7 with Shockwave™.

that span out around the head. It was as simple as rotate, copy, and paste. Then I layered the hi-res images in Macromedia xRes. To get seven fingers on the hands, I cloned a finger in xRes and extended it to look realistic. But I also wanted this image to be surreal, so I used Hue/Saturation to achieve the green effect. Extreme 3D came in handy to model the eyeballs and make them really pop. And voilà! My self-portrait." Thanks for the great work, Usok. (And trust us, he's much better looking face to face.)



Soon-to-be-famous designer Usok S. Choe on the FreeHand Graphics Studio 7: "Here's how I did it. I created the type in FreeHand, rotating the text around an arc. Then I used a cool 3D rotating tool, distorting it and giving it a new twist. The fonts I used were created in Fontographer; I picked them up from the Font Bureau. I saved time by using FreeHand's Union Punch/Intersect feature for the lines

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No one provides better legal self-help than Nolo Press, a longtime leader in do-it-yourself law books. Small Business Legal Pro Deluxe is a well-designed CD adaptation of four of Nolo's best-selling business books: *The Legal Guide for Starting and Running a Small Business*, *Tax Savvy for Small Business*, *The Employer's Legal Handbook*, and *Everybody's Guide to Small Claims Court*. All of this information is extremely well indexed; you can search any or all of the books by word or a list of keywords. A search on *loans*, for example, returns 26 matches, ranging from an in-depth discussion in *Starting and Running a Small Business* on raising money for your new venture, to a discussion in *Tax Savvy* on lending yourself money as a shareholder in a C corporation.

There are more than 50 forms and printable sidebars with detailed information on selected topics. The included IRS forms alone (in Adobe Acrobat format) make this product worthwhile for the harried businessperson with no time to run to the post office.

Quicken Business Law Partner doesn't approach Nolo's level of detail. Instead, it provides 68 commonly used business forms and helps you fill them out correctly via an interview-style format. It provides you with some basic descriptive information on the forms and their use, but if you're looking for an in-depth discussion, you won't be satisfied.

To its credit, Business Law Partner does a good job of making its forms easy to complete, and provides a built-in editor so you can change their format. You can also save common names and addresses, assign password protection to documents, and check your spelling.

Quicken Business Law Partner provides a rather useless QuickTime video, *Ask the Expert*, featuring Harvard Law School's Arthur Miller answering frequently asked legal questions. His answers, though, are quite general and often include advice to consult with an attorney or become familiar with your state's laws. Worse, this feature is not linked to the rest of the program, so after Miller tells you to get an employment agreement in writing, there's no way to move directly to that form and fill it out.



Legal Aid Small Business Legal Pro Deluxe offers well-indexed access to popular Nolo Press books.

The Last Word

Priced well below the cost of an hour's consultation with a lawyer, either of these programs will pay for itself by the first use. If you want to be fully informed on a wide variety of legal issues, Small Business Legal Pro Deluxe is a great value. If you just want to get the job done with a minimum of fuss, and will be satisfied with a cursory explanation, Quicken Business Law Partner should suffice.—LIZA WEIMAN HANKS

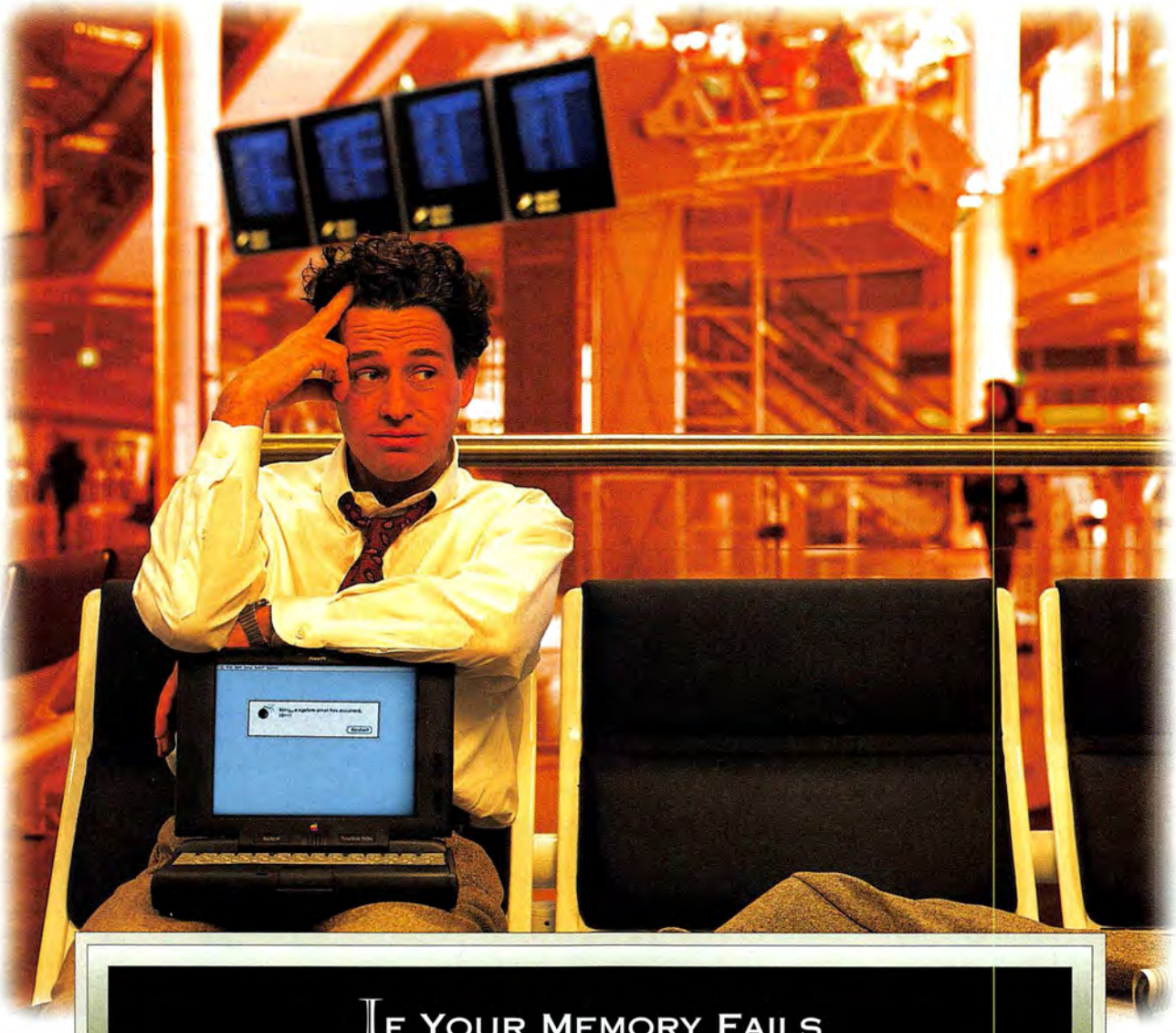
Quicken Business Law Partner 2.0

RATING: ★★★/6.9 **PROS:** Useful legal documents; interview option; password protection; spelling checker. **CONS:** Coverage could be more comprehensive; *Ask the Expert* feature isn't integrated. **COMPANY:** Parsons Technology (319/395-9626, *http://www.parsonstech.com*). **LIST PRICE:** $49.

Small Business Legal Pro Deluxe 2.0

RATING: ★★★★/7.6 **PROS:** Comprehensive information; well indexed; customized searching functions. **CONS:** None. **COMPANY:** Nolo Press (510/549-1976, *http://www.nolo.com*). **LIST PRICE:** $59.95.

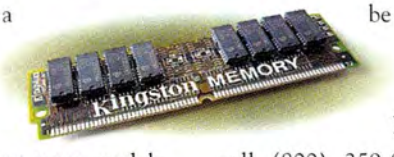
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SAM 4.5

PROTECT AGAINST INTERNET-BASED VIRUSES

THE LATEST VERSION OF SYMANTEC AntiVirus for Macintosh (SAM) keeps a watchful eye out for Internet-based viruses with a feature called SafeZone. Otherwise, the feature set of SAM 4.5 is hardly changed from that of previous versions.

As always, you can set SAM to check for viruses and so-called suspicious activities (such as attempts to modify a program). The program detects all known Mac viruses, including Trojan horses and the ever-present varieties of the Microsoft Word macro virus. SAM can also check Word and Excel files shared across a network.

A scheduling feature lets you run virus scans at preset times, and you can set SAM to call Symantec's BBS at regular intervals to check for updated detection strings. Like DataWatch's Virex and McAfee's VirusScan 2.0, SAM 4.5 creates a reference file during its first scan, which speeds up subsequent scans of your drive.

SafeZone, SAM's new feature, sets aside part of your hard drive for special attention. When you download files to that location from the Internet, SAM checks them and warns you if they're infected with a virus. (This capability isn't unique to SAM; Virex offers the same thing.)



Give Me a String You can set SAM 4.5 to automatically check for virus-detection updates.

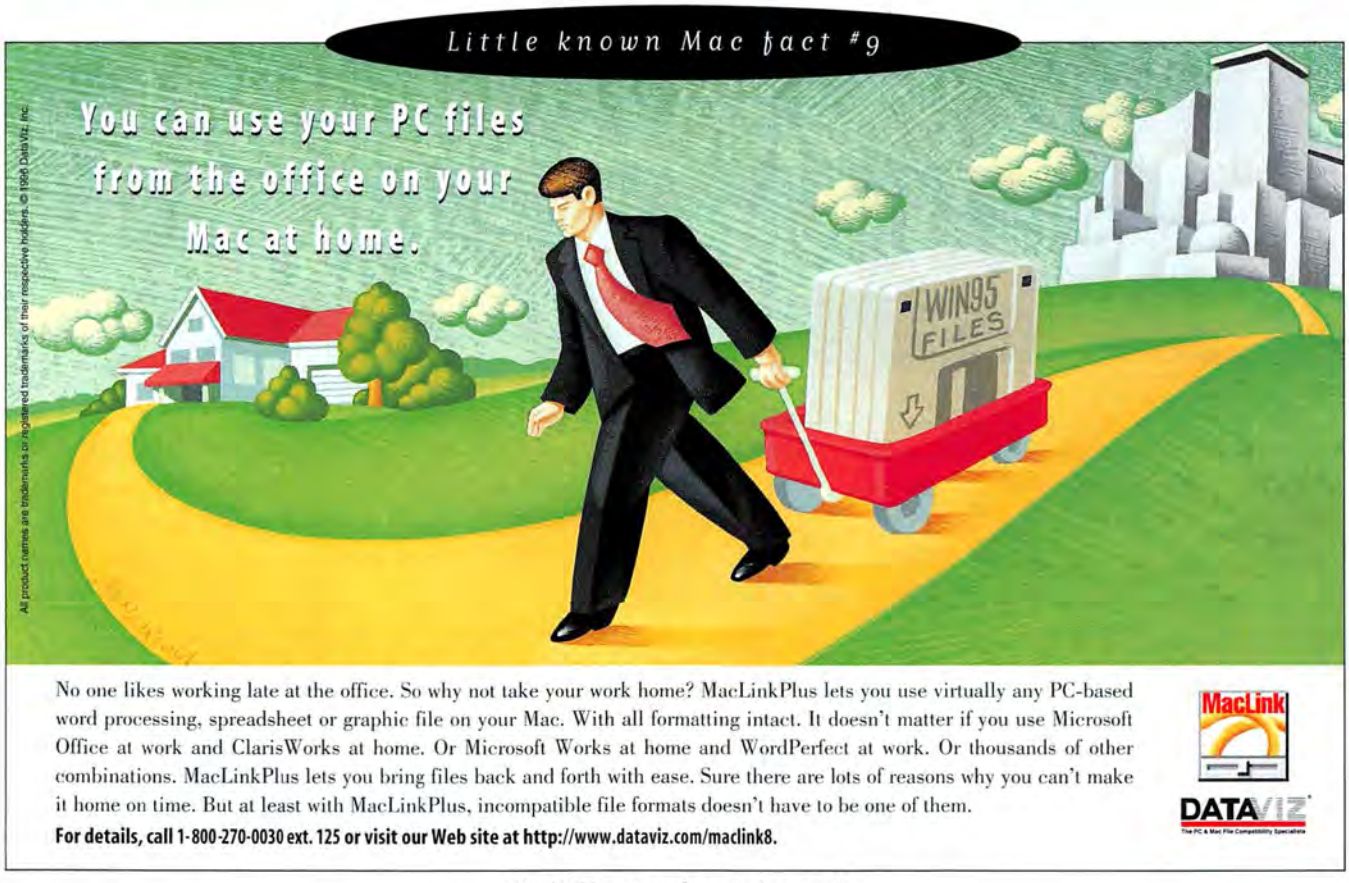
SAM offers the unique ability to recognize when you're installing software. When you launch an installer, SAM asks if you wish to turn virus protection off until the software is installed, to keep SAM from interfering with the installation.

My experience with SAM 4.5 didn't start out well. I had frequent start-up crashes on my Power Mac 9500 (running System 7.5.5). On a Power Computing clone and a PowerBook 5300ce, I had no start-up problems at all. Other users of SAM 4.5 have reported start-up crashes in Symantec's support boards, and the publisher is looking into the problem. When scanning my larger hard drives, SAM consistently froze, but I solved this problem by giving the program more RAM.

SAM was otherwise reasonably well behaved, if sometimes overenthusiastic about suspicious activities. It flagged potential problems with such popular programs as Casady & Greene's Spell Catcher and Adobe Type Manager. Fortunately, SAM's Remember feature prevented recurrences. Start-up times were noticeably longer with SAM running, but otherwise, general performance was not seriously affected (except for a slight slowdown in text-entry speed with Word 6.0.1).

The Last Word SAM 4.5's initial erratic behavior concerned me, but I have since managed to get it to run satisfactorily. Symantec always promptly fixes bugs discovered with its software, so I expect lingering problems will be solved before long. In most respects, this is a minor upgrade, but SAM 4.5 is still industrial-strength virus protection.—GENE STEINBERG

RATING: ★★★/6.4 **PROS:** Reasonably fast scans; SafeZone protects against Internet-based infections; automatic updates via modem. **CONS:** Slight system slowdown; occasional false positives; a few bugs. **COMPANY:** Symantec (408/253-9600, *http://www.symantec.com*). **LIST PRICE:** $69.95.



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CanOpener 3.5

RECOVER GRAPHICS AND TEXT RELIABLY FROM DAMAGED FILES

PICTURE THIS: YOUR MAC CRASHES. When you restart, you find that the document you were working on is damaged and cannot be opened. Before you begin to think about the hours of work you'll have to redo, think about Abbott Systems' CanOpener. CanOpener 3.5 is the latest version of a clever program that retrieves graphics and text from almost any document file. The newest version adds support for JPEG and Photo CD pictures, allows you to convert graphic files from one format to another, and opens e-mail and World Wide Web documents (including HTML source files).

There's not much of a learning curve in this program, which is good, because documentation is nearly nonexistent—no Help menu, no Apple Guide. When you install the software, you get six pages of electronic documentation and a one-page Read Me file, and that's it.

You do your work from a three-paned document window (see "Yes, Any File"). The pane at the top left is a list of readable files; the one at the right divides the elements of the file into text and pictures, each separately accessible; and the bottom pane contains the extracted material.

I successfully used CanOpener to open files created in word processors including ClarisWorks, Microsoft Word, Nisus Writer, and Corel's WordPerfect; desktop publishing documents prepared in programs such as QuarkXPress; and every graphics file format I could find, whether Mac or Windows based. I opened e-mail files, Web-browser bookmarks, dictionary files, and more. In all the documents I tried to open, CanOpener could extract the picture and at least some of the text in a readable fashion, no matter what the format.



Yes, Any File CanOpener can open nearly any file, including the artwork files your Web browser caches on your hard drive when you surf your favorite sites.

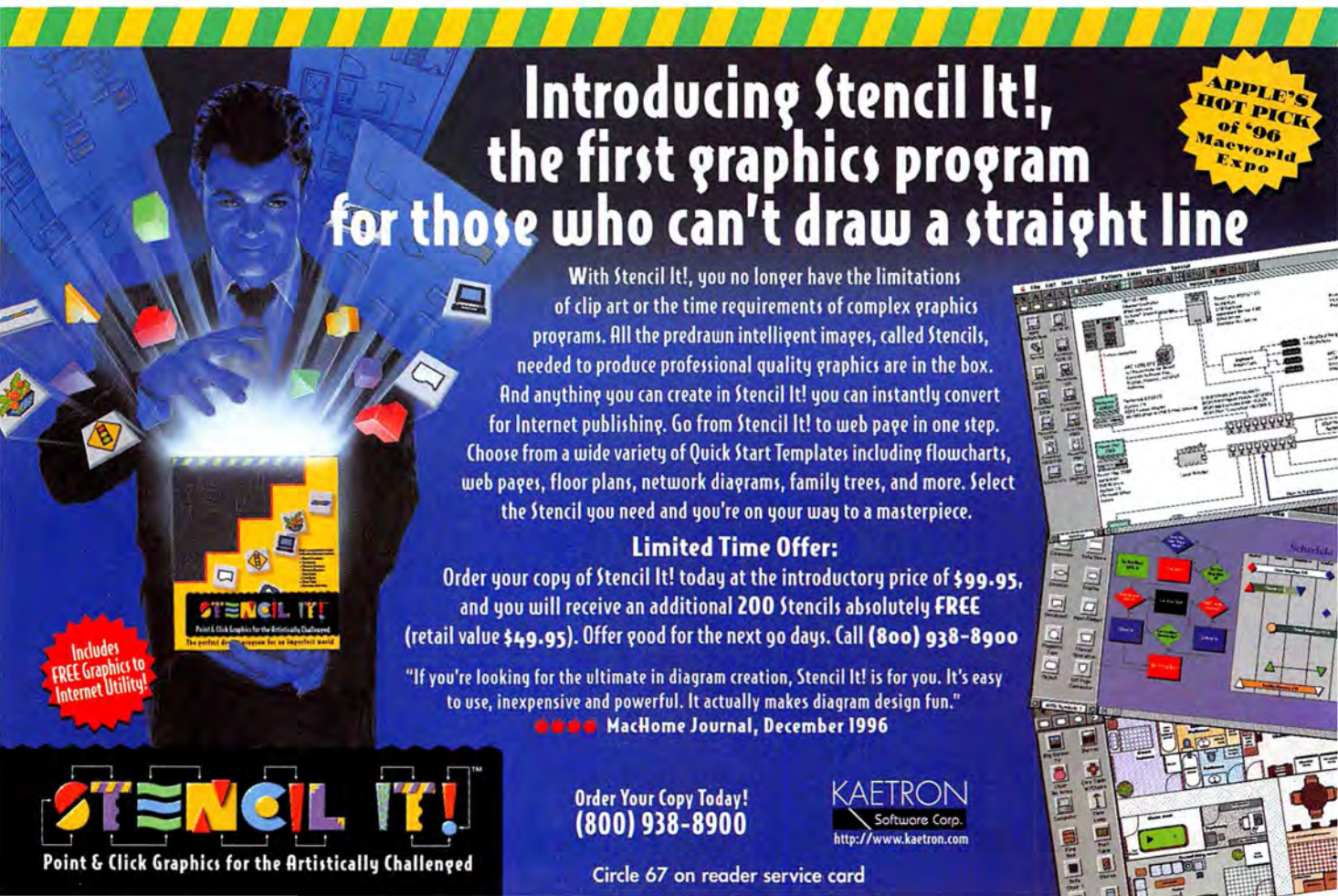
CanOpener has some limits. For example, templates in desktop publishing programs don't translate, nor do text and paragraph formatting. Spreadsheets remain largely unrecovered, except for titles and occasional text.

There are minor interface oddities as well. Functions such as Save As, which you normally expect to find in the File menu, are placed in the Item menu instead. The program also lacks support for Apple Extended Keyboard features such as home, end, page up, and page down.

CanOpener 3.5 is bundled with another useful utility, RescueTxt (see *Reviews*, April 1995), which finds text in most documents—even those you've trashed—as long as the files haven't been overwritten or removed with a security erase program.

The Last Word Whether you deal with files from many sources or just want to be able to recover graphics and text from a damaged file, CanOpener is an absolutely indispensable tool. It is reliable and nearly foolproof.—GENE STEINBERG

RATING: ★★★★/7.6 **PROS:** Remarkable ability to extract something from most document files; fast and stable; relatively intuitive. **CONS:** Interface quirks; meager documentation. **COMPANY:** Abbott Systems (914/747-4171, *http://www.abbottsys.com*). **LIST PRICE:** $65.



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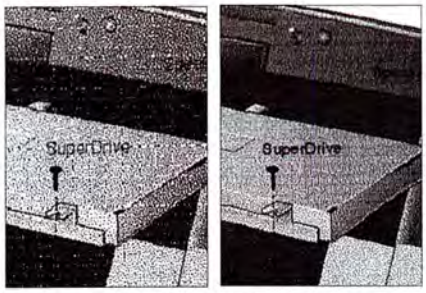
StellarFax

FAX ENHANCER DOESN'T SHINE

TECHPOOL'S STELLARFAX 1.1 PROMises to turn your PostScript or other documents into higher-quality faxes that take less time to transmit than they would via standard fax software. Although the speed claim is true, the StellarFax output proved markedly inferior to the highest-quality setting of either Global Village's GlobalFax 2.5.6 or STF Technologies' Faxstf 3.2.1 (see *Reviews*, October 1996).

The StellarFax package includes a PostScript Level 2 software RIP (raster image processor) and Stellar Setup, a control panel that lets you set hot keys to override the regular printer temporarily. You print from within your application using the StellarWriter driver, a Chooser extension that RIPs the file and spools the processed version onto your hard drive. (You can also drop PostScript, EPS, or Acrobat files onto StellarFax's icon.) The print process launches Stellar Viewer, an application that lets you see processed files before you fax them. From Stellar Viewer, you use your favorite fax software to send the document.

StellarFax's output is a real disappointment. On both thermal- and plain-paper laser fax machines, it simply wasn't as good as either GlobalFax or Faxstf at their best gray-scale settings (see "Faster or Better?").



Faster or Better? Although StellarFax documents (left) transmit faster than typical fax-modem pages (right), you'll pay for that speed with poor image quality.

With several Adobe Illustrator documents, StellarFax produced faxes that showed less contrast and more obvious dithering than the other two fax programs. Fine detail was lost, and small type became unreadable. Gradients were smoothed too much—distracting banding was nearly eliminated, but contrast was muddy. Photographs fared equally poorly: StellarFax's dither pattern made the image look as if it had been spattered with white paint.

TechPool's other claim for StellarFax—faster transmission speeds—proved to be true. Sending the StellarFax version of a document took 22 percent less time on average, which could add up to savings on phone charges for users with high fax volume.

Unfortunately, though, StellarFax suffers from a number of bugs, ranging from annoying to incapacitating. Holding down hot keys to switch temporarily to StellarWriter rarely works; it's best to switch to StellarWriter within the Chooser. On several occasions, I experienced a system crash while StellarFax was processing PostScript files; on one occasion, the crash was so severe that it corrupted the Stellar Viewer application, requiring reinstallation of the whole package. Increasing the components' RAM allocation lessened but didn't cure the frequency of system errors.

The Last Word The ability to send inferior-quality faxes faster is a dubious one, and it probably isn't going to win StellarFax any converts. Until TechPool fixes the program's bugs and delivers on the promise of better fax quality, I can't recommend StellarFax.—TOM NEGRINO

RATING: ★/2.7 **PROS:** Improved transmission speed. **CONS:** Poor image quality; buggy software. **COMPANY:** TechPool (216/291-1922, *http://www.techpool.com*). **LIST PRICE:** $249.

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MovieStar 1.5

EASY QUICKTIME MOVIEMAKING AND ANIMATION FOR THE INTERNET

THE WEB IS FULL OF INNOVATIVE displays of technology. But when it comes to streaming sound and video, we're not so easily impressed—after all, television has been delivering those for 50 years. With consumer demand and sophistication outstripping current technology, streaming data to the Internet is a challenge for Web developers. Intelligence at Large has released one solution: a souped-up version of MovieStar, a multimedia authoring tool best suited to the intermediate multimedia developer and novice Webmaster. Version 1.5 adds support for Apple's QuickTime 2.5, drag and drop for GIF and JPEG formats, and transition and transparency effects. MovieStar also promises streaming QuickTime movies from WebStar servers with the appropriate plug-in. But does it deliver?

Combining text, movies, animated GIFs, and MIDI objects into a MovieStar project is simple: just drag and drop them (text can also be cut and pasted) into files saved in Apple's QuickTime format. You can apply transition effects—fades, wipes, and zooms—to any visual object through MovieStar's Transition Settings dialog box, and you can apply fades to any sound objects.



Roll 'Em MovieStar not only helps you export your movies to existing Web pages, it helps you create the Web pages themselves.

MovieStar can even export your completed QuickTime movie to a rudimentary Web page. You enter titles, headers, footers, and body text into the Export as HTML dialog box, and MovieStar creates HTML tags for them (see "Roll 'Em"). You can customize colors using the Color Picker and add transparency to backgrounds and translucency to objects.

Animating GIFs is a simple recording process, but there's one catch: if you want to rotate an object in MovieStar, you're out of luck. After double-checking the user guide (the best I've seen in a long while), I spoke to a courteous technical support person—who sent me back to Adobe Photoshop to do the rotating.

While MovieStar makes it easy to create streaming movies, along with JPEG and GIF89 animations, the problem is that these "fast-start" movies stop as fast as they start. Users will be disappointed when they discover—after downloading the MovieStar plug-in—that no QuickTime movie will download fast enough to keep pace with its playback. The result is a halting, awkward showing that leaves users in limbo while they download a complete QuickTime movie to their browsers.

The Last Word MovieStar fills the gap between Adobe Persuasion and Macromedia Shockwave, and it incorporates a basic WYSIWYG HTML editor besides. It's worth considering, both for its ease of use and for the variety of file formats it can incorporate into QuickTime movies—just don't be duped by the false promise of streaming video.—MARK BAARD

RATING: ★★★/5.5 **PROS:** Great interface; can drag and drop sound, movies, and still pictures into a project. **CONS:** Streaming QuickTime movies are impractical; can't create rotating GIFs. **COMPANY:** Intelligence at Large (215/387-6002, *http://www.ialsoft.com*). **LIST PRICE:** $149.95.



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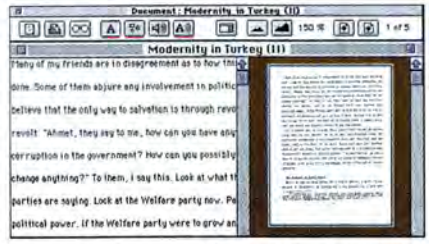
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THE PERSONAL COMPUTER REVolution was supposed to help relieve the paper explosion, but most of us still have huge quantities of paper lying around our offices. Enter Dominion Software's new product, WorkingPapers, an optical character recognition (OCR) program and document organizer. You can use WorkingPapers to organize scanned documents into fully searchable collections.

WorkingPapers supports most popular models of scanners. You can scan both text and graphics, using the OCR capability to convert documents to text if necessary. WorkingPapers' built-in OCR engine is trainable and quite accurate; you can also use Xerox's TextBridge software. Once you've converted a document to text, the program's basic editing tools let you make text corrections, as well as change typeface, size, and style.

Your document collection appears as a two-frame window. The frame on the left shows the actual document page. On the right are smaller, thumbnail images of the pages. A collection can contain up to 32,000 items, which you can sort by file name, location, date, or a category you assign. You can search open or closed collections by category, comments, file name, volume name, and the documents' text.



Convenient Document Processing A WorkingPapers collection shows you the document page at the left and a thumbnail view at the right.

WorkingPapers lets you use Apple's Speech Manager to listen to the contents of the page on screen, and you can add voice annotation using the program's very basic recording feature. To save disk space, the program uses QuickTime to compress images. You can e-mail WorkingPapers documents using PowerTalk.

One of the program's limitations becomes apparent when you go to put your data into a word-processing or desktop-publishing document. If your document-creation software has drag-and-drop capability, you can simply drag selected text or thumbnails of one or more pages to your new document. But if drag and drop isn't supported, you must copy the text to the Clipboard and then paste it into the document you're creating—there's no text-export option. Making matters worse, you can copy and paste only one page at a time, which makes transferring a multipage file a clumsy process. It would also be nice to be able to scan and run optical character recognition as a single process.

The program was reasonably stable in regular use, but the publisher has documented a conflict with Apple's Macintosh Easy Open control panel; Dominion Software hopes to fix that in version 1.1.

The Last Word WorkingPapers does a nice job of converting your paper explosion into neatly organized electronic documents. With a few fixes to its interface, and some additional file-export options, it could become an indispensable tool for managing your documents.—GENE STEINBERG

RATING: ★★★/6.5 **PROS:** Brisk performance; accurate OCR engine; good manual. **CONS:** Minor bugs and interface blemishes; limited file-import and -export options. **COMPANY:** Dominion Software (617/332-1144, *http://world.std.com/~dominion*). **LIST PRICE:** $199.95.

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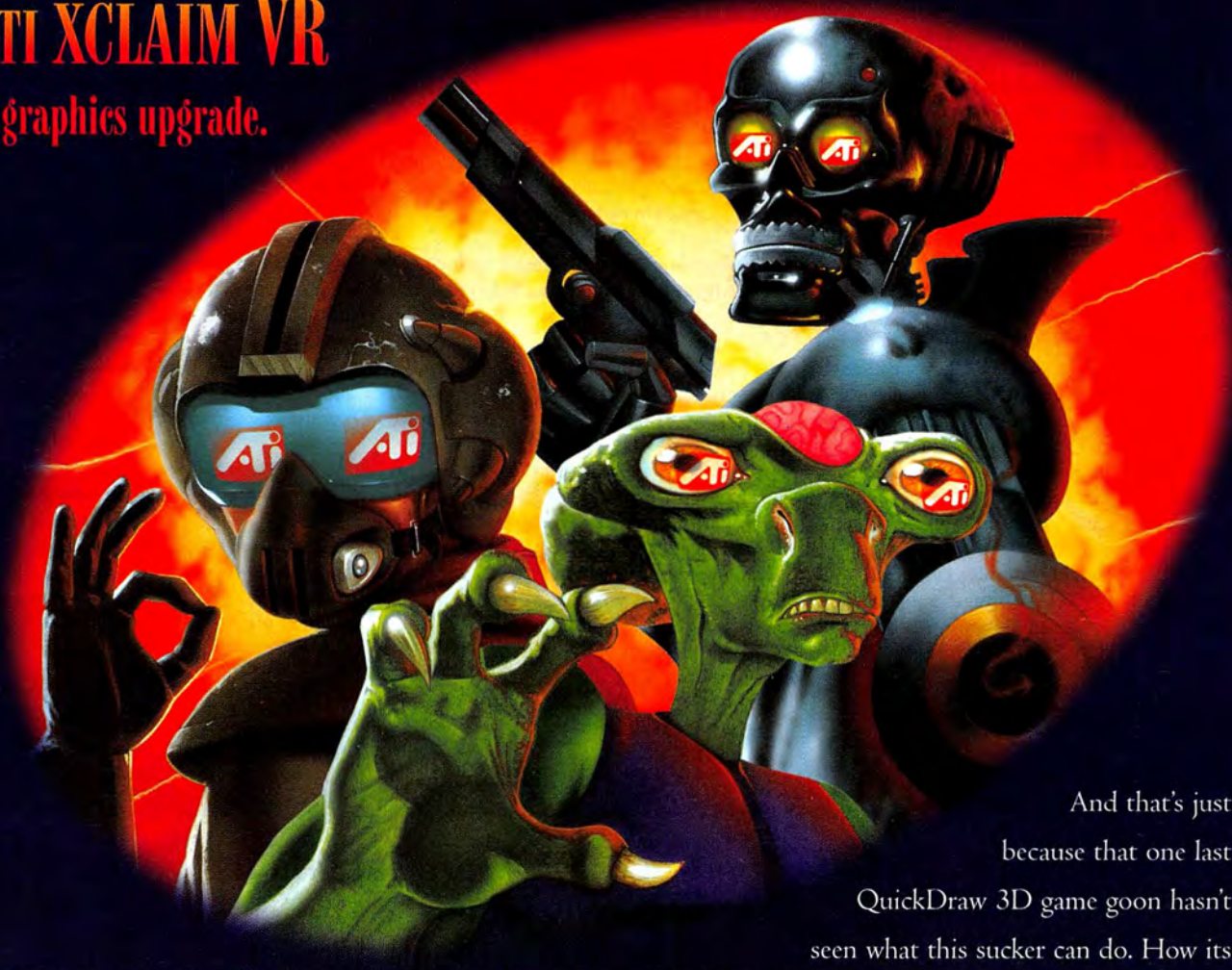
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MAC2TV



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Circle 257 on reader service card

Capitalism

MONEY TALKS IN THIS SIMULATOR

GREED IS GOOD AND MONEY IS power—at least within the world of Interactive Magic's Capitalism, a financial simulation game in which you assume the role of a fictional company's leader in a randomly generated world. You start out with $10 million, and your goal is to parlay that money into billions and join the Top 100 list of the world's richest people.

As you plot your dominance of the business world, questions start to arise: Should you go the corporate-raider route and focus on the stock market? Is the research on your Wedge-o-Matic 9000 complete enough for it to hit the shelves before Christmas? Will the Securities and Exchange Commission try to stop your latest stock purchase? Every choice you make has repercussions, and you must be willing to accept the consequences to get a bigger and bigger slice of the pie.

If this sounds complicated, it should—this is not your father's Monopoly. Capitalism is an extremely complex game, and you need to be willing to invest a lot of time before you truly understand its scope, and even more before you master it. Along with the full-scale simulator, Capitalism includes eight educational games that help you learn to play—and unless you are a Fortune 500 CEO already, you *will* need them.



Someday, All This . . . If you plot fiendishly, plan wisely, and strategize boldly, you can become the master of a worldwide financial empire.

Beginners can keep game play simple, focusing on a single type of business, such as department stores. As you become more adept, you can try your hand at farming, mining, or playing the stock market to ruin competing corporations. Within these various industries, you can focus on developing better products, a better brand name, or simply cheaper products. In some scenarios, you must complete specific goals in order to triumph.

Varying levels of difficulty mean that as your skills sharpen, so do those of your opponents. The game isn't networkable, so although you can buy out your virtual opponents, you can't merge with—or menace—your real-life friends.

Capitalism's interface can often be as obscure as the game itself, and although it takes a fair amount of time to decipher some of the game's icons, the charts and corporate reports are all easily understandable to anyone with basic accounting skills.

The Last Word Capitalism is as realistic as simulation games get, and although certain aspects of the business world are left out—such as issuing preferred stock—these omissions help keep the game from becoming even more complicated than it already is. If you have a family or social life you treasure, you'll want to set a time limit for your games. If you don't, your priorities may shift. Inside all of us there's a little monster that always wants more. This game feeds that monster.—DANIEL MADAR

RATING: ★★★★/7.1 **PROS:** Realistic simulations of the business world. **CONS:** Complexity may be daunting; not networkable. **COMPANY:** Interactive Magic (919/461-0722, *http://www.imagicgames.com*). **COMPANY'S ESTIMATED PRICE:** $54.95.



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NEW	**Who Is Oscar Lake–Spanish** WIN3.1 486/50, 4mb or MAC 68040, 8mb, M	Language Tutor.	5076401
	Police Quest: Open Season Adventure 5002803 DOS 386, 4mb or MAC LC, 8mb, M		
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Software

BUSINESS

★★★★/7.9 **Big Business 2.0,** Big Software, 408/725-7200, $199 to $999. All-in-one business application integrates sales, marketing, ordering, and accounting. *Jan 97, p. 64*

★★★/6.5 **Butler SQL 2.0.2,** EveryWare Development, 905/819-1173, $695. This SQL database is well suited for serving data over the Internet. *Oct 96, p. 104*

★★★★/8.1 **Claris Organizer 2.0,** Claris, 408/727-8227, $69. Solid upgrade is worth the wait. *Jan 97, p. 62*

★★★★/8.4 **ClarisWorks 4.0,** Claris, 408/727-8227, $129 (estimated). The program has speed, a clean design, and low resource requirements. *Jun 96, p. 98*

★★★★★/9.5 **DeltaGraph 4.0,** DeltaPoint, 408/648-4000, $195. Top Mac graphing application still excels. *Sep 96, p. 90*

★★★★/8.2 **FileMaker Pro 3.0,** Claris, 408/727-8227, $199 (estimated). FileMaker 3 is now relational, Power Mac native, and more useful than ever. *Jun 96, p. 98*

★★★/6.3 **Map Factory,** ThinkSpace, 519/858-5047, $996. Unique raster-based mapping program. *Nov 96, p. 70*

★★★/6.7 **Microsoft Word 5.1,** Microsoft, 206/882-8080, $320 (estimated). Fast, sleek, stable, and probably the most widely used Mac word processor on earth. *Jun 96, p. 98*

★★★/5.1 **Microsoft Word 6.0.1,** Microsoft, 206/882-8080, $295 (estimated). The most bloated word processor on earth may be mandatory in big corporations. *Jun 96, p. 98*

★★★★/7.1 **Panorama 3.0,** ProVue, 714/841-7779, $290 (estimated). This database program features easy, flexible forms, hypertext links, and fast network abilities. *Jun 96, p. 98*

★★★★/7.2 **PhoneDisc PowerFinder 2.2,** Digital Directory Assistance, 301/657-8548, $129. CD-ROM telephone directory offers instant response times. *Nov 96, p. 74*

★★/3.0 **Phone Search USA 2.0,** DeLorme Mapping, 207/865-1234, $49. Inexpensive but bare-bones telephone directory on CD-ROM. *Nov 96, p. 74*

★★★★/8.8 **Sculpt 2.0,** Interactive Simulations, 619/658-9462, $895. Molecular modeling at blazing speeds. *Oct 96, p. 84*

★★★★/7.2 **Select Phone 4.0,** Pro CD, 508/750-0055, $99. Reliable telephone directory has nice interface. *Nov 96, p. 74*

★★/4.5 **Street Atlas USA 3.0,** DeLorme Mapping, 207/865-1234, $79. Map program update is better and cheaper, but still flawed. *Nov 96, p. 100*

★★★/5.1 **TakeNote 1.0,** Academix Software, 415/493-3003, $79.95. Reference tool goes halfway to replacing the familiar index card. *Jan 97, p. 88*

★★★★/7.1 **Timeslips 4.0,** Timeslips, 214/248-9232, $299.95. Time-tracking and -billing package is unnecessarily complex. *Jan 97, p. 86*

★★★★/7.4 **WordPerfect 3.5,** Corel, 613/728-8200, $129 (estimated). In speed, interface efficiency, and Macintosh integration, WordPerfect beats all competitors. *Jun 96, p. 98*

EDUCATION/ENTERTAINMENT

★★★★/8.2 **Afterlife,** LucasArts, 415/507-4545, $45. Wacky simulation mixes Dante, Milton, and P.T. Barnum. *Jan 97, p. 130.* **Editors' Choice** for best simulation game.

★★★★/8.2 **Alphabet Express,** School Zone Publishing, 616/846-5030, $39.95. Lots of puzzles and games for teaching kids the alphabet, and so easy to use even parents might learn a thing or two. *Dec 96, p. 134*

★★★★/8.7 **Amber: Journeys Beyond,** Changeling, 512/419-7085, $70. Think Myst à la Stephen King. *Jan 97, p. 130.* **Editors' Choice** for best adventure game.

★★★★/7.1 **America Rock,** Creative Wonders, 800/543-9778, $39.95. CD-ROM capitalizes on the solid learning theories of the original *Schoolhouse Rock* TV spots. *Jan 97, p. 54*

★★★★/8.8 **Bad Mojo,** Pulse Entertainment, 800/264-0325, $40. A sickeningly delightful experience: you become a cockroach. *Jan 97, p. 130.* **Editors' Choice** for best role-playing game.

★★★★/7.4 **Beyond the Wall,** Twentieth Century Fox Home Entertainment, 310/369-3900, $29.95. Subtle but haunting emotional resonance in CD about Vietnam Veterans Memorial. *Dec 96, p. 134*

★★★/6.5 **Blizzard's Holiday Jamboree,** Brøderbund, 415/382-4400, $19.95. Wild West–themed holiday activity kit with a goofy attitude. *Jan 97, p. 54*

★★★★/7.2 **Chess Mates,** BrainStorm, 888/427-2467, $34.95. Entertaining instruction for fledgling chess nerds. *Jan 97, p. 54*

★★★★/8.0 **Cinemania 97,** Microsoft, 206/882-8080, $34.95. Indispensable multimedia guide to 20,000 films, with a more streamlined interface than previous versions. *Dec 96, p. 134*

★★★/6.1 **Corel All-Movie Guide 2,** Corel, 613/728-8200, $25.95. Handy CD is the next best thing to having a cinema buff inside your computer. *Jan 97, p. 54*

★★★★/7.9 **Critical Mass: America's Race to Build the Atomic Bomb,** Corbis, 206/641-4505, $49.95. Easy interface to interactive 3-D graphics, with biographics, timelines, and archival documents. *Dec 96, p. 134*

★★★★/7.7 **Descent II,** MacPlay, 800/462-2752, $59.95. Real enough to make you queasy. *Dec 96, p. 88*

continues

REAL PRODUCTS REAL RATINGS Reviews you can trust: Unlike other publications, Macworld rates only final shipping products, not prototypes. What we review is what you can actually buy. Outstanding ★★★★★ = 9.0–10.0 Very Good ★★★★ = 7.0–8.9 Good ★★★ = 5.0–6.9 Flawed ★★ = 3.0–4.9 Unacceptable ★ = 0–2.9

Star Ratings

★★★★/7.8 **Digital Lab,** Philips Media, 303/739-4131, $44.99. An entertaining, hands-on project kit for budding wire-heads. *Jan 97, p. 54*

★★★★/7.0 **Exploring the Lost Maya,** Sumeria, 415/904-0800, $49.95. Well-crafted interactive tour with QuickTime VR view of Mayan sites in Mexico and Central America. *Dec 96, p. 134*

★★★★/8.5 **Flight Unlimited,** Looking Glass Technologies, 617/576-3310, $50. Puts you in touch with what makes flying special. *Jan 97, p. 130.* **Editors' Choice** for best flight simulator.

★★★★/7.2 **Green Eggs and Ham,** Living Books, 415/352-5200, $29.95. A charming, lighthearted adaptation of the classic Dr. Seuss book. *Jan 97, p. 54*

★★★/6.7 **Grolier Science Fiction: Multimedia Encyclopedia,** Grolier Interactive, 203/797-3530, $39.95. Fun but somewhat shallow guide to sci-fi books, movies, TV shows, and culture. *Dec 96, p. 134*

★★★/6.9 **Gryphon Bricks,** Gryphon, 619/536-8815, $30. Virtual Lego bricks for your inner cyber-child. *Jan 97, p. 54*

★★★★/8.4 **IndyCar II,** Sierra On-Line, 800/757-7707, $55. This champion of race games has just about everything you can think of. *Jan 97, p. 130.* **Editors' Choice** for best sports game.

★★★★/7.0 **Infinity City,** Headbone Interactive, 206/323-0073, $29.95. Educational CD for teaching math skills to kids. *Dec 96, p. 134*

★★★★/7.7 **Leonardo the Inventor 2.0,** SoftKey, 617/494-1200, $29.95. CD-ROM illustrates da Vinci's life and inventions. *Jan 97, p. 54*

★★★★/7.9 **Microsoft Bookshelf 1996–97,** Microsoft, 206/882-8080, $54.95. No other Mac CD serves up as many top-notch reference resources. *Dec 96, p. 134*

★★★★/8.5 **Microsoft Encarta 96 Encyclopedia,** Microsoft, 206/882-8080, $54.95. Solid information combined with maximum entertainment value. *Dec 96, p. 134*

★★★★/7.9 **Origami: The Secret Life of Paper,** Casady & Greene, 408/484-9228, $39.95. Tutorial CD teaches you how to to recycle paper with style. *Jan 97, p. 54*

★★★★/7.4 **Pantsylvania,** Headbone Interactive, 206/323-0073, $29.95. Highly interactive, completely off-the-wall fun in an entertaining and original CD. *Dec 96, p. 134*

★★★/6.8 **Paul Cézanne: Portrait of My World,** Corbis, 206/641-4505, $49.95. Interactive tour of Cézanne's life and art. *Dec 96, p. 134*

★★★/6.7 **Planet Earth: Explore the Worlds Within,** Macmillan Digital USA, 212/654-8500, $49.95. Interactive atlas goes beyond globe-trotting, but the interface could use a makeover. *Dec 96, p. 134*

★★★★/7.5 **RedShift 2,** Maris Multimedia, 415/492-2819, $54.95. Superb animations, film clips, and photographs make for a wealth of astronomical data. *Dec 96, p. 134*

★★★/6.9 **Saunders Interactive General Chemistry CD-ROM 2.1,** Saunders College Publishing, 800/782-4479, $49.95. First-year chemistry for the MTV generation. *Dec 96, p. 86*

★★★★/7.0 **Sheila Rae the Brave,** Brøderbund Software, 415/382-4400, $39.95. Engaging entry about a mouse for kids with songs and games. *Dec 96, p. 134*

★★★★/8.7 **Spaceward Ho 4.0,** Delta Tao Software, 408/730-9336, $59. Interstellar empire building relies on strategy, not brute strength. *Jan 97, p. 130.* **Editors' Choice** for best network game.

★★★★/8.1 **Spycraft: The Great Game,** Activision, 310/479-5644, $45. Spycraft is better than a le Carré novel. *Jan 97, p. 130.* **Editors' Choice** for best multimedia game.

★★★★★/9.0 **Step On It,** Casady & Greene, 408/484-9228, $40. Addictive arcade game will drive you mad until you solve it. *Jan 97, p. 130.* **Editors' Choice** for best arcade game.

★★★★/7.0 **Sundial: The Original Timelapse Desktop,** John Neil & Associates, 415/905-3000, $29.95. A control panel that syncs outdoor scenery to your Mac's clock. *Jan 97, p. 54*

★★★★/8.1 **Van Gogh Starry Night,** Voyager, 212/431-5199, $39.95. Just enough interactivity to make this a worthwhile CD-ROM, but not so much that you wander off in various directions. *Dec 96, p. 134*

★★★/6.1 **Virtual Pool,** MacPlay, 714/553-6655, $39.95. Billiards simulator guarantees to improve your game. *Jan 97, p. 95*

★★★★/7.2 **Volcanoes: Life on the Edge,** Corbis, 206/641-4505, $49.95. Fascinating facts about volcano history from a National Geographic photographer who visited nine active volcanoes between 1991 and 1992. *Dec 96, p. 134*

★★★★/7.7 **Warcraft II: Tides of Darkness,** Blizzard, 714/955-1382, $55. Impressive strategy game is a wonderful clash between humans and Orcs. *Jan 97, p. 130.* **Editors' Choice** for best strategy game.

★★★★/7.8 **Where in the World Is Carmen Sandiego? 3.0,** Brøderbund, 415/382-4400, $39.95. Classic geography adventure adds new crime-solving fun. *Jan 97, p. 54*

★★★★/7.8 **Williams-Sonoma Guide to Good Cooking,** Brøderbund, 415/382-4400, $39.95. A domestic gift that won't gather dust alongside that unused crockpot. *Jan 97, p. 54*

★★★★/8.9 **You Don't Know Jack XL,** Berkeley Systems, 510/540-5535, $40. Gloriously irreverent, borderline-tasteless send-up of every bad game show. *Jan 97, p. 130.* **Editors' Choice** for best party game.

GRAPHICS

★★★★/7.1 **Adobe Illustrator 6.0.1,** Adobe Systems, 415/961-4400, $595. Efficient and well-organized drawing program doesn't surpass FreeHand 5.5. *Jan 97, p. 112.*

★★★/5.7 **Canvas 5.0,** Deneba, 305/596-5644, $599.95. Midrange graphics program has professional price. *Jan 97, p. 112*

★★/4.6 **CorelDraw 6 Suite,** Corel, 613/728-8200, $595. Graphics suite lacks solid image-editing and drawing programs. *Jan 97, p. 112*

★★★★/7.8 **ElectricImage Broadcast 1.0,** Electric Image, 818/577-1627, $2495. 3-D animation tool gets new price, new features. *Nov 96, p. 88*

★★/4.7 **Fastedit/Deluxe,** Total Integration, 847/776-2377, $249. Photoshop plug-in lets you edit quickly, but is expensive. *Nov 96, p. 92*

★★★★/7.5 **Form-Z RenderZone 2.8,** Autodessys, 614/488-9777, $1995. Impressive 3-D modeler gets rendering know-how. *Oct 96, p. 75*

★★★★/7.9 **Infini-D 3.5,** Specular, 413/253-3100, $649. Approachable, practical mix of 3-D design ingredients. *Jan 97, p. 70*

★★★★/8.3 **Kai's Power Goo,** MetaTools, 805/566-6200, $49.95. Family image-editing software that pros will use. *Jan 97, p. 84*

★★★★/7.2 **Live Picture 2.5,** Live Picture, 408/464-4200, $995. Live Picture stills lacks support for the blend modes and numerical focus controls and can edit only the topmost visible layer, but is superfast. *Jun 96, p. 78*

★★★★/8.1 **Macromedia FreeHand 5.5,** Macromedia, 415/252-2000, $595. Draw program outperforms all competitors. *Jan 97, p. 112.* **Editors' Choice** for best illustration software.

★★★★/8.9 **Painter 4.0,** Fractal Design, 408/688-5300, $549. Most artists should own Painter 4.0; its painting and special-effects capabilities simply can't be beat. *Jun 96, p. 78*

★★★★/8.2 **PowerCADD 3.0,** Engineered Software, 910/299-4843, $795. Fast, pro-level drafting program gets some refinements. *Jan 97, p. 74*

★★★★/8.1 **Slicer 1.0,** Fortner Research, 703/478-0181, $695. View 2-D slices of 3-D images. *Nov 96, p. 98*

★★★/6.5 **Stencil It 1.0,** Kaetron Software, 713/298-1500, $99. Low-cost program is good for charts, but not for art. *Jan 97, p. 72*

★★★★/8.2 **Stylist 1.0,** Alien Skin Software, 919/832-4124, $199. Plug-in adds graphic and text style sheets to Illustrator. *Oct 96, p. 64*

★★★★/7.4 **TurboCAD 2D/3D 3.0,** IMSI, 415/257-3000, $149. Nearly high-end CAD program with educational-software price. *Dec 96, p. 61*

INTERNET/NETWORKING

★★★/5.7 **Amapi 2.11,** Yonowat, 415/788-1652, $398. 3-D modeler marred by awkward interface. *Nov 96, p. 87*

★★★★/7.2 **Apple Network Administrator's Toolkit,** Apple Computer, 408/996-1010, $599. Suite automates the most important chores of classroom management. *Dec 96, p. 70*

★★★★/7.0 **AppleScript 1.1,** Apple Computer, 408/996-1010, free. Standout CGI scripting tool is built into System 7.5. *Oct 96, p. 104*

★★/4.6 **Arachnid 1.6,** University of Iowa, *robert-mcburney@uiowa.edu,* free. This HTML editor helps you manage your site as a whole. *Oct 96, p. 114*

★★★/5.4 **BBEdit 4.0,** Bare Bones Software, 508/651-3561, $119. BBEdit is a useful tool for any active Webmaster. *Oct 96, p. 114*

★★★★/7.0 **BeyondPress 2.0,** Astrobyte, 303/534-6557, $595. XPress-to-HTML conversion program whisks you from XPress to the Internet. *Oct 96, p. 57*

★★★★/7.7 **Bookends Web 3.2,** Westing Software, 415/945-3870, $179. Useful, flexible tool for creating bibliographies on the Web. *Dec 96, p. 82*

★★★/5.5 **cc:Mail Mobile for Macintosh 2.0,** Lotus Development, 617/577-8500, $145. Speedy and straightforward choice for PC-centric environments, but lacks many features competitors offer. *Oct 96, p. 134*

★★★/6.6 **ChameleonNFS 3.6,** NetManage, 408/973-7171, $395 per user. Collection of small, fast Internet apps. *Nov 96, p. 81*

★★★★/8.6 **Claris Emailer 1.03,** Claris, 408/987-7000, $49 (estimated). The only application that dumps (almost) all of your messages in one in-box. *Oct 96, p. 134.* **Editors' Choice** for best e-mail over the Internet.

★★★/6.9 **Claris Home Page 1.0,** Claris, 408/727-8227, $99 (estimated). Home Page leads the pack of HTML editors. *Dec 96, p. 58*

★★★/6.8 **COPSTalk 2.0 for Windows 95,** CoOperative Printing Solutions, 770/840-0810, $159. Cross-platform networking for PC users who need access to Mac servers. *Nov 96, p. 68*

★★★★/8.0 **CyberGauge,** Neon Software, 510/283-9771, $139. Network monitoring for the masses. *Nov 96, p. 83*

★★★/6.8 **DigiPhone 1.0,** Third Planet Publishing, 972/733-3005, $39.95. Make low-cost calls over the Internet. *Jan 97, p. 68*

★★★★/8.1 **Electronic Commerce Suite 2.0,** iCAT, 206/623-0977, $4995. Electronic Commerce Suite

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builds complex yet robust Web sites quickly and easily. *Oct 96, p. 104.* **Editors' Choice** for best software for building dynamic Web sites.

★★★★★/9.1 **EtherPeek 3.0,** The AG Group, 510/937-7900, $995. Slew of enhancements will make this network analyzer your right hand. *Dec 96, p. 77*

★★★/6.1 **Eudora Pro 3.0,** Qualcomm, 619/658-1200, $89. Internet e-mail reader improves, but not by much. *Nov 96, p. 77*

★★★★/7.8 **Excel Internet Assistant 1.0,** Microsoft, 206/882-8080, free. Excel Internet Assistant converts existing Excel files to HTML. *Oct 96, p. 114*

★★★★/8.1 **FirstClass 3.11,** SoftArc, 905/415-7000, $495 to $1495. Offers robust e-mail, conferencing, and other features, yet easy to use. *Oct 96, p. 134.* **Editors' Choice** for best company-wide e-mail.

★★★★/7.5 **Frontier 4.1,** UserLand Software, *http://www.scripting.com/frontier*, free. Fast and powerful scripting environment requires advanced programming knowledge. *Jan 97, p. 152.* **Editors' Choice** for best Internet tools.

★★★/5.3 **Front Office 1.5,** STF Technologies, 213/259-1710, $299. Being able to retrieve a call that's gone to voice mail is great, but easier setup is necessary. *Nov 96, p. 132*

★★★/6.7 **GlobalTransfer 1.0,** Global Village, 408/523-1000, $29.95. Transferring files the easy way. *Oct 96, p. 82*

★★★/6.1 **GNNPress 1.1,** PrimeHost, 800/879-6882, $199/month for commercial site. GNNPress combines a powerful HTML editor with a site-management tool. *Oct 96, p. 114*

★★/4.9 **golive Pro 1.1,** gonet communication, 415/463-1580, $99. Attractive HTML editor needs polishing. *Dec 96, p. 58*

★★★/5.6 **HexWeb XT 2.0,** HexMac International, 415/864-7592, $349. XPress-to-HTML conversion program whisks you from XPress to the Internet. *Oct 96, p. 57*

★/2.9 **HoTMetaL Pro 2.0,** SoftQuad, 416/239-4801, $159. This Web editor just doesn't cut the mustard. *Oct 96, p. 114*

★★/3.8 **HTML Author 1.0,** Adobe Systems, 415/961-4400, included with PageMaker 6.0. This plug-in converts Adobe PageMaker files to HTML. *Oct 96, p. 114*

★★★★/7.9 **HTML Editor 1.1.4,** Rick Giles, *rick.giles@acadiau.ca*, $25. This text editor is a great all-around HTML coding aid. *Oct 96, p. 114.* **Editors' Choice** for best Web authoring tools.

★★★/6.8 **HVS Color 1.2,** Digital Frontiers, 847/328-0880, $99. Keep Web graphics small, colors true. *Oct 96, p. 72*

★★★★/7.7 **InterMapper 1.0.1,** Dartmouth College, 603/646-2643, $795. World-class network management. *Jan 97, p. 83*

★★★★/7.3 **Internet Phone 3.0.1,** VocalTec, 201/768-9400, $49.95. Novices may like this software that lets you make low-cost calls over the Internet. *Jan 97, p. 68*

★★★/6.5 **LAN Commander,** Power On Software, 612/879-9190, $299.95 five-station pack. Network management made simple. *Oct 96, p. 79*

★★★/6.2 **MacHTPL 2.2.2,** Tim Endres, *time@ice.com*, free. This preprocessor can help you tailor your HTML for specific browsers *Oct 96, p. 104*

★★★/6.3 **MacPerl 5.0.6,** Matthias Neeracher, *neeri@iis.ee.ethz.ch*, free. This CGI scripting language is portable to other platforms. *Oct 96, p. 104*

★★★/6.8 **MacSOUP 2.1,** Stefan Kurth, *stk@kagi.com*, $20. Strong offline e-mail and news reader; that's all it handles, though. *Jan 97, p. 152*

★★★/6.7 **Marionet 1.1.1,** Allegiant Technologies, 619/587-0500, $149. Flexible scripting and search tool for authoring environments, but it requires significant programming knowledge. *Jan 97, p. 152*

★★★★/7.0 **MegaPhone 1.02,** Cypress Research, 408/486-7900, $100. Great for automated dialing, but limited phone-book capability is disappointing *Nov 96, p. 132*

★★★★/7.0 **NetCloak 2.1,** Maxum Development, 630/830-1113, $195. Quirky WebStar add-on is a must-buy. *Jan 97, p. 66*

★★★★/8.7 **NetDoubler 1.0,** Asanté, 408/435-8388, $69.95 to $99. Boosts network speeds for large files. *Dec 96, p. 68*

★★★/6.5 **NetForms 2.0,** Maxum Development, 630/830-1113, $195. WebStar add-on fills gaps in server software. *Jan 97, p. 66*

★★★★/7.4 **Netscape Navigator 3.0,** Netscape Communications, 415/937-2555, $49. Still the best browser, but could use a diet. *Nov 96, p. 62*

★★★★/7.1 **NewsHopper 1.2,** SW15 Software, *http://www.demon.co.uk/sw15/*, $59. Powerful, scriptable reader, but can't be scheduled and handles only Usenet news. *Jan 97, p. 152*

★★★/6.6 **Now Up-to-Date Web Publisher 1.0,** Now Software, 503/274-2800, $129.95. Publish your calendars and contact lists on the Web. *Dec 96, p. 78*

★★★/6.7 **PageMill 1.02,** Adobe Systems, 415/961-4400, $149. This WYSIWYG HTML editor does its job with reliability and flair. *Oct 96, p. 114*

★★★★/7.5 **PC MacLAN 6.0 for Windows 95,** Miramar Systems, 805/966-2432, $199. The choice for peer-to-peer cross-platform networking. *Nov 96, p. 68*

★★★/6.9 **Phantom 1.1,** Maxum Development, 708/830-1262, $395. Wonderful Web robot for the Mac is server-friendly, but also expensive and useful primarily for Webmasters. *Jan 97, p. 152*

★★★/6.3 **QuickMail 3.6,** CE Software, 515/221-1801, $199 to $1449. Easy to use, but message-tracking features are limited. *Oct 96, p. 134*

★★★★/7.6 **Retrieve It 2.5,** MVP Solutions, 415/562-3457, $65. Speedy, complex searches of your computer and the Web. *Dec 96, p. 80*

★★★/6.3 **SiteMill 1.0.3,** Adobe Systems, 415/961-4400, $595. SiteMill is a powerful management tool for your Web site. *Oct 96, p. 114*

★★/4.8 **SuperVoice 2.0,** Pacific Image Communications, 818/457-8880, $130. Hampered by bugs, glitches, and inability to import phone numbers. *Nov 96, p. 132*

★★★/6.7 **SupraSonic VoiceMail,** Diamond Multimedia, 360/604-1400, $289. Still looks like fax software with voice capability added on, but it's got potential. *Nov 96, p. 132*

★★★/6.6 **Tango 1.5,** EveryWare Development, 905/819-1173, $495. This CGI program forwards queries to a SQL database and reformats the responses into HTML. *Oct 96, p. 104*

★★★★/7.3 **Tango for FileMaker Pro 3.0,** EveryWare, 905/819-1173, $349. Tool kit for putting your FileMaker database on the Web. *Oct 96, p. 59*

★★★/6.7 **Tapestry 1.1,** Concept 1, 905/305-8655, $69. Beginners get help weaving the perfect Web site. *Oct 96, p. 80*

★★★/6.8 **tcpConnect4 4.0 Enterprise,** InterCon, 703/709-5500, $495 per user. Internet access suite is easy to set up, but lacks some conveniences. *Nov 96, p. 81*

★★★/6.9 **TCP/IP Scripting Addition,** Mango Tree Software, 617/327-8663, $49. Tool for AppleScript provides access to TCP/IP commands. *Jan 97, p. 152*

★★★★/7.2 **Timbuktu Pro 3.0,** Farallon Communications, 510/814-5000, $139. Network access tool extends its reach. *Jan 97, p. 69*

★★★/5.5 **Timbuktu Pro for Networks 2.0,** Farallon Computing, 510/814-5000, $139 to $3999. Despite some drawbacks, this is the next-best thing to being there. *Oct 96, p. 134*

★★★★/7.4 **Tumbleweed Publishing Essentials 1.0,** Tumbleweed Software, 415/363-7022, $695. A faster, cheaper alternative to Acrobat. *Oct 96, p. 70*

★★★/5.5 **Voice Messenger,** Cypress Research, 408/486-7900, $149. A clean and simple interface, but easier setup is necessary. *Nov 96, p. 132*

★★★/5.8 **WebArranger 2.0,** CE Software, 515/221-1801, $79. Powerful bookmark manager is good at managing large quantities of information. *Jan 97, p. 152*

★/2.6 **Web Buddy 1.0,** DataViz, 203/268-0030, $50. Offline Web browser makes it easy to set up a schedule, but is a memory hog. *Jan 97, p. 152*

★/1.0 **WebDoor 1.2,** Open Door Networks, 541/488-4127, $20 to $60/month. WebDoor's authoring software is abysmal. *Oct 96, p. 114*

★★★★/7.9 **Webmaker 2.2,** Harlequin, 617/374-2400, $99. For converting FrameMaker documents to the Web, WebMaker has no equal. *Oct 96, p. 114.* **Editors' Choice** for best Web authoring tools.

★★★★/7.2 **Web-Motion 1.0,** Terran Interactive, 408/278-9025, $99.95. Web-savvy plug-in for first-rate compression utility. *Jan 97, p. 81*

★★/4.4 **WebWhacker 1.0.8,** Forefront Group, 713/961-1101, $70. Clean, simple interface, but offline Web browser lacks scripting and scheduling. *Jan 97, p. 152*

★★★★/7.8 **Word Internet Assistant 1.0,** Microsoft, 206/882-8080, free. Word Internet Assistant converts existing Word files to HTML. *Oct 96, p. 114*

★★★★/8.0 **YoYo 1.2,** Big Island Communications, 408/342-8300, $149. Innovative telephony software is an amazing productivity tool. *Nov 96, p. 64*

MEDIA

★★★★/8.2 **AD-1 Pro Audio Analyzer 2.0,** Intelligent Devices, 410/744-3044, $349 to $449. Audio meters for the discriminating producer. *Dec 96, p. 84*

★★★★/7.4 **Adobe Premiere 4.2,** Adobe Systems, 415/961-4400, $795. Video editor offers significant enhancements, including CD-ROM Movie Maker plug-in. *Mar 96, p. 90*

★★★★/7.5 **Boris Effects 2.0,** Artel Software, 617/566-0870, $350 to $695. Inexpensive, multichannel digital-video-effects program is a worthwhile investment. *Jan 97, p. 76*

★★★/6.7 **Digital Chisel://HTML 2.1.3,** Pierian Spring Software, 503/222-2044, $109 to $995. Multimedia authoring doesn't make it on the Web. *Jan 97, p. 78*

★★★★/7.2 **Director 5.0,** Macromedia, 415/252-2000, $1195. Multimedia authoring tool gets polish and a performance boost. *Jul 96, p. 52.* **Editors' Choice** for best authoring programs. *Aug 96, p. 100*

★★★★/7.4 **Movie Cleaner Pro 1.2.1,** Terran Interactive, 408/278-9025, $189.95. First-rate movie compression utility is a must-have. *Jan 97, p. 81*

★★★★/7.2 **MovieFlo' 2.0.2,** The Valis Group, 415/435-5404, $699. Image-distortion software for pros. *Jan 97, p. 92*

★★★★/7.8 **Pro View 1.3,** E-magine, 800/603-1474, $99.95. Back-to-basics presentation tool. *Nov 96, p. 95*

★★★★/8.0 **QuarkImmedia 1.0,** Quark, 303/894-8888, $995. An easy move from print to multimedia. *Dec 96, p. 57*

UTILITIES

★★/4.1 **At Ease 3.0,** Claris, 408/987-7000, $49. Can

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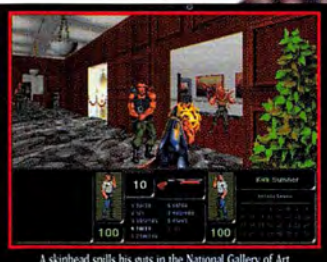
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be easily defeated with a Disk Tools floppy or separate start-up disk. *Nov 96, p. 146*

★★★★/7.9 **BorderGuard Access Router,** Network Systems, 612/424-4888, $1700. Transparent encryption of AppleTalk and TCP/IP that lets you use the Internet instead of a private WAN. *Nov 96, p. 146*

★★★/6.2 **cypherPad,** usrEZ Software, 714/756-5140, $49. Easy setup and usage; good basic security. *Nov 96, p. 146*

★★★★/7.3 **DiskGuard 1.5,** ASD Software, 909/624-2594, $79. Good combination of low price and easy installation. Solid, basic protection. *Nov 96, p. 146*

★★★★/7.9 **DiskLock 4.0,** Symantec, 541/984-2490, $129. Easy automatic setup makes this a snap to configure; has most protection features you need. *Nov 96, p. 146*

★★/4.9 **DiskWorks 3.0.2,** MicroNet Technology, 714/453-6100, $299. Disappointing hard-drive formatter has an awkward interface. *Dec 96, p. 62*

★★★/6.1 **Dr. Solomon's Anti-Virus Toolkit 7.61,** S&S International, 617/273-7400, $85. Antivirus utility can check DOS disks. *Dec 96, p. 60*

★★★/6.0 **Empower 5.0.4,** Magna, 408/879-7907, $129. Decent design, but overpriced for features offered. *Nov 96, p. 146*

★★★★/8.0 **FileGuard 3.0,** ASD Software, 909/624-2594, $139. Most of the features you need, combined with ease of installation, reliable performance, and robust protection. *Nov 96, p. 146.* **Editors' Choice** for best desktop security software.

★★★/6.6 **Font Box 1.8.3,** Insider Software, 619/622-9900, $79.95 to $169.95. Font fixer could use some repairs. *Nov 96, p. 90*

★★/4.9 **FoolProof 2.5,** SmartStuff Software, 503/231-4300, $39. Decent design, but lacks features and is too easy to defeat. *Nov 96, p. 146*

★★★★/7.0 **Hard Disk ToolKit 2.0.1,** FWB, 415/463-3500, $199. Reliable hard-drive formatter can actually tweak a drive to run faster. *Dec 96, p. 62*

★★★/6.8 **KeyQuencer 2.0,** Binary Software, 310/449-1481, $39.95 direct. Macro program for speed addicts and control freaks. *Dec 96, p. 59*

★★★★/7.8 **KeyServer 4.1,** Sassafras Software, 603/643-3351, $800. Easy-to-install tool enforces usage thresholds and lets you track applications. *Nov 96, p. 146*

★★★★/8.3 **Mac Manager 3.1,** ELS, 352/375-0558, $299. Provides both safe and impenetrable access protection and data encryption. *Nov 96, p. 146*

★★★★/7.5 **MATLAB Statistics Toolbox 2.0,** The MathWorks, 508/647-7000, $395. Statistical analysis tool on steroids. *Dec 96, p. 75*

★★★★★/9.3 **MATLAB Wavelet Toolbox 1.0,** The MathWorks, 508/647-7000, $895. Wavelet-analysis tool on steroids. *Dec 96, p. 75*

★★★★/7.7 **McAfee VirusScan 2.0,** McAfee Associates, 408/988-3832, $65. World-class virus protection has little impact on Mac's performance. *Dec 96, p. 60*

★★★★/8.1 **NetShade 1.1,** Atemi, 217/352-3689, $299. Easy to install and configure, it scrambles data and foils all but the most determined sniffers. *Nov 96, p. 146*

★★★★/8.1 **Network Security Guard 3.1,** Mr. Mac Software, 619/453-2845, $289. Scans your network for unintentional guest access, poorly chosen passwords, and other security loopholes. *Nov 96, p. 146*

★★★★/7.1 **On Guard 2.1,** Power On Software, 216/735-3116, $70. Easy install, attractive Finder-like

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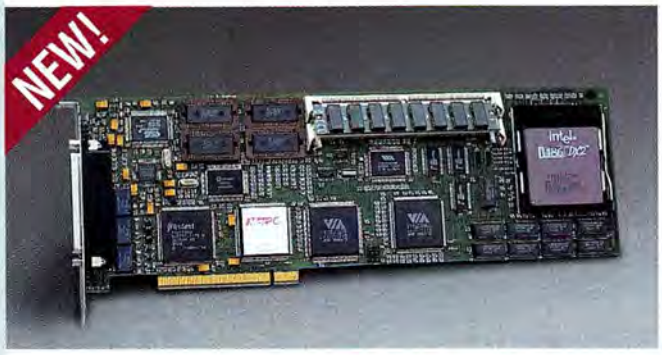
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Star Ratings

configuration menu; low-priced. *Nov 96, p. 146*

★★★★/8.2 **QuicKeys 3.5,** CE Software, 515/224-1995, $119. QuicKeys exists to make macros easier. *Dec 96, p. 59*

★★★★/8.6 **RAM Doubler 2.0,** Connectix, 415/571-5100, $99. Control panel now triples your RAM. *Dec 96, p. 67*

★★★/6.1 **SecretAgent 3.0,** AT&T, 847/405-0390, $249. An overpriced one-trick pony; its advantage is cross-platform compatibility. *Nov 96, p. 146*

★★★★/7.8 **Spell Catcher 1.5.6,** Casady & Greene, 408/484-9228, $59.95. Resurrected Thunder 7 is still much more than a spelling checker. *Dec 96, p. 73*

★★★★/8.1 **Symantec Anti-Virus for Macintosh 4.0.8,** Symantec, 541/984-2490, $70. Fast scanning, easy setup. *Nov 96, p. 146*

★★★★/7.0 **ultraSecure,** usrEZ Software, 714/756-5140, $239. A textbook of required security features, hampered by so-so manual and complex installation. *Nov 96, p. 146*

★★★/6.4 **ultraShield,** usrEZ Software, 714/756-5140, $149. Mixed combination of terrific features with complex installation and multiple warnings about use with other software. *Nov 96, p. 146*

★★/4.3 **UnderCover,** SmartStuff Software, 503/231-4300, $39. A slightly buggy one-trick pony. *Nov 96, p. 146*

★/2.1 **ViaCrypt PGP 4.0,** ViaCrypt, 602/944-0773, $129. Hard to install, hard to use; few saving graces. *Nov 96, p. 146*

★★★/6.9 **Virex 5.6.7,** Datawatch, 508/988-7000, $100. Fast scanning, but caused general system slowdown. *Nov 96, p. 146*

★★★★/7.0 **WebLock 1.0,** Maxum Development, 708/830-1113, $195. Gives your Web server access protection via password log-in to protect private pages. *Nov 96, p. 146*

★★★★/8.5 **WebStar SSL 1.2.4,** Quarterdeck, 310/309-3700, $1295. Lets you use transparent encryption to exchange sensitive data safely with security socket layer-capable Web browsers. *Nov 96, p. 146.* **Editors' Choice** for best network security.

Hardware

MISCELLANEOUS HARDWARE

★★★★/8.9 **3M Precise Mousing Surface,** 3M, 612/733-1110, $15. Throw out your neoprene pad and treat your mouse to a deluxe surface. *Jan 97, p. 56*

★★★★/8.2 **AirCommunicator Lite,** Air Communications, 408/567-8000, $695. Cellular fax modem with flair offers a complete solution. *Nov 96, p. 79*

★★★★/8.8 **MicroWorks,** Cambridge SoundWorks, 617/332-5936, $349. In terms of price for performance, speaker system is in a class by itself. *Dec 96, p. 66*

★★/3.1 **Midi Land S35/818 Systems,** Midi Land, 909/592-1168, 818 desktop speaker $79.95, S35 subwoofer $239.95. Speaker system has mediocre sound quality. *Nov 96, p. 72*

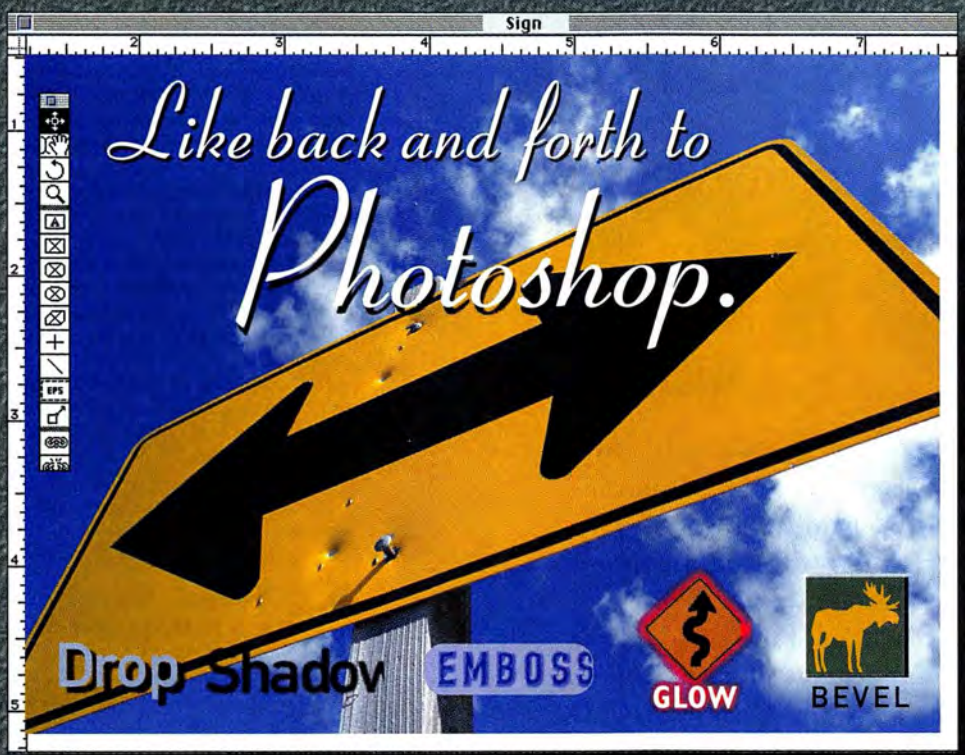
★★★/6.0 **NovaModem 288 1.0,** NovaLink Technologies, 510/249-9777, $229. Decent performance from PowerBook PC Card modem. *Nov 96, p. 94*

★★★★/7.6 **SoundWorks,** Cambridge SoundWorks, 617/332-5936, $219.95. High-quality audio product at an affordable price. *Dec 96, p. 66*

★★★★/7.0 **Supra Simple Internet 33.6 1.0,** Diamond

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Star Ratings

Multimedia, 360/604-1400, $159.95. Modem makes Internet access quick and easy. *Jan 97, p. 90*

★★★/6.9 **Viewpoint Model 100,** Lightware, 503/641-7873, $5795. Much light, some sound in a surprisingly small projector. *Nov 96, p. 85*

★★★★/7.1 **Yamaha System 45,** Yamaha, 714/522-9240, $249.95. Speakers give you decent sound at a decent price. *Nov 96, p. 72*

STORAGE

★★★★/7.6 **2.6GB Optical,** La Cie, 503/520-9000, $1999. Low price for this format, great software, and high-performance Sony mechanism. *Oct 96, p. 141.* **Editors' Choice** for best optical drives.

★★★/6.2 **640MB MO Optical,** La Cie, 503/520-9000, $599. Decent performance, low media cost; but no performance match for Iomega's Jaz drive. *Oct 96, p. 141*

★★★/6.6 **8 Plex,** Plextor, 408/980-1838, $539. Uses its own mechanism, FWB driver software, but costs more than other bundles. *Dec 96, p. 145*

★★★★/7.1 **8× External CD-ROM Drive for Mac,** La Cie, 503/520-9000, $199 (estimated). Price/performance leader, with well-implemented audio software. *Dec 96, p. 145.* **Editors' Choice** for best CD-ROM drive.

★★★/5.8 **Advantage 8× External CD-ROM,** MicroNet Technology, 714/453-6000, $249 (estimated). Performed well, but lacks power-on light and external audio-control buttons. *Dec 96, p. 145*

★★★★/7.2 **APS PD4,** APS Technologies, 816/483-1600, $499.95. Excellent low-priced, small-footprint unit, bundled with APS PowerTools, PowerCD. *Oct 96, p. 141.* **Editors' Choice** for best optical drives.

★★★/6.9 **CDS658PSD,** Dynatek, 902/832-3000, $349. Nicely designed; offers speedy performance and superior driver software. *Dec 96, p. 145*

★★★/5.9 **Cheetah Plus,** Plasmon Data, 408/474-0100, $2575. Minimal documentation, mediocre performance reduce this drive's appeal. *Oct 96, p. 141*

★★★★/7.4 **DisKovery 2600MO,** Optima Technology, 714/476-0515, $2395. Reasonable price, great software, and uses a high-performance Sony mechanism. *Oct 96, p. 141*

★★★/6.7 **EZFlyer 230MB,** SyQuest, 510/226-4000, $299; cartridges $29.95. SyQuest's new removable drive tries (again) to outzip Iomega. *Oct 96, p. 56*

★★★/5.4 **HammerDisk 230,** FWB, 415/325-4392, $769. Overpriced; uses older, slow technology. *Oct 96, p. 141*

★★★/5.0 **HP SureStore Optical 2600FX,** Hewlett-Packard, 970/635-1000, $2995. Poor performance in its class, a lead brick of a case, and overpriced. *Oct 96, p. 141*

★★/4.9 **LF-7300A,** Panasonic Communications & Systems, 201/348-7000, $2995. Overpriced and slow; it can't compete with a 2.6GB MO drive. *Oct 96, p. 141*

★★/4.8 **PCA80SC,** Philips Electronics, 408/773-1304, $299. Disappointing performance, though excellent audio software. *Dec 96, p. 145*

★★★/6.9 **PD/CD,** Plasmon Data, 408/474-0100, $620 (estimated). This dual-purpose drive is worth considering if you need a CD-ROM drive. *Oct 96, p. 141*

★★★/5.2 **PD/CD-ROM,** Panasonic Communications & Systems, 201/348-7000, $649.95. Nonstandard

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Star Ratings

connectors, DIP SCSI ID settings, and poor documentation bring this drive down. *Oct 96, p. 141*

★★★/6.4 **Phasewriter Dual PD,** Toray Marketing & Sales, 415/341-7152, $649 (estimated). Neither price nor performance can keep pace with the competition's. *Oct 96, p. 141*

★★★/6.8 **PowerMO 2600,** Olympus Image Systems, 516/844-5000, $2199 (estimated). Reasonable price and a two-year warranty, but middle-of-the-pack performance. *Oct 96, p. 141*

★★★/5.5 **SCSI Express CD37,** Micro Design International, 407/677-8333, $505. Slightly slower than the 8× drives, this 6.7× drive offered sturdy design and well-designed driver software. *Dec 96, p. 145*

★★★/5.8 **T4-2600,** Maxoptix, 510/353-9700, $2425. No formatting software included and slow performance in its class. *Oct 96, p. 141*

VIDEO/DISPLAY

★★★/6.3 **Diamond Pro 91TXM,** Mitsubishi Electronics America, 714/220-2500, $1699. Pricey for an average product, with below-average image quality. *Jan 97, p. 125*

★★★/6.1 **G200,** IBM, 914/766-1900, $1469. Easy to use, but below-average image quality. *Jan 97, p. 125*

★★★★/7.6 **G810,** ViewSonic, 909/869-7976, $1595. A great price for a top pick in both usability and image quality. *Jan 97, p. 125.* **Editors' Choice** for best two-page monitors.

★★★/6.7 **Multigraph 445Xi,** Nokia Display Products, 415/331-4244, $1899. A little pricey for a monitor that offers only medium image quality. *Jan 97, p. 125*

★★★/6.7 **Multiple Scan 20,** Apple Computer, 408/996-1010, $2149. Good overall image quality, but pricey for its category. *Jan 97, p. 125*

★★★/6.6 **MX21F-M,** Mag InnoVision, 714/751-2008, $1699. Average price for average usability and image-quality scores. *Jan 97, p. 125*

★★/4.7 **P201,** IBM, 914/766-1900, $2635. Poor image quality and hard to use. *Jan 97, p. 125*

★★★/6.2 **PanaSync S21,** Panasonic, 201/348-7000, $1899. Good controls, but a little expensive for below-average image quality. *Jan 97, p. 125*

★★★/5.8 **PrecisionView 21,** Radius, 408/541-6100, $2749. Overpriced for only average test scores and a one-year warranty. *Jan 97, p. 125*

★★★/6.9 **Pro P810,** ViewSonic, 909/869-7976, $1745. Superb image quality, but costlier than its sibling, the G810. *Jan 97, p. 125*

★★★★/7.4 **RasterOps SuperScan Mc20,** Hitachi NSA, 617/461-8300, $1599. Good bargain for an overall good performer. *Jan 97, p. 125*

★★★/6.6 **RasterOps SuperScan Mc801HR,** Hitachi NSA, 617/461-8300, $2199. A bit costly for only above-average image quality, mediocre controls. *Jan 97, p. 125*

★★★/6.4 **SyncMaster 21 GLs,** Samsung Electronic America, 201/971-0400, $1959. Expensive unit for overall average performance. *Jan 97, p. 125*

★★★/5.6 **Ultra 20-M,** Princeton Graphic Systems, 714/751-8405, $1249. Inexpensive, but you get what you pay for—not high quality. *Jan 97, p. 125*

★★★/6.4 **VisionMaster 21,** Iiyama North America, 215/957-6543, $1945. A good unit, but not good enough to justify the price. *Jan 97, p. 125*

★★★★/8.3 **VisionMaster Pro 21,** Iiyama North America, 215/957-6543, $1995. Top overall image quality with clear on-screen controls. *Jan 97, p. 125.* **Editors' Choice** for best two-page monitors. ■

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Mac Superguide

MACWORLD SELECTS THE BEST MAC OS SYSTEMS

Looking for a new Macintosh but confused about which of all the new models to buy? Look no further. Each month, the *Mac Superguide* section provides *Macworld*'s picks for the best Mac OS systems. Typically we recommend three top choices: an Editors' Choice winner and two runners-up. Occasionally we'll have more or fewer top choices in categories with unusually competitive—or uncompetitive—options.

You'll also find *Macworld* Star Ratings and Macworld Lab performance benchmarks for all Mac OS systems shipping as we went to press in late November 1996. You may read about other Mac models in *Macworld* and elsewhere, but those are prototypes not yet available—the only systems rated here are those you can actually buy.

For Mac systems reviewed earlier, the summaries below include the issue date and page number of the article. In some cases, such as faster versions of existing Macs, there is no full review and thus no cross-reference. New systems are indicated in the benchmark by the ▶ icon.

Star Ratings and Editors' Choice designations may have changed since previous issues, based on the current line-up of systems and any price changes; the winners listed here are the current ones.

All prices but Power Computing's are company-estimated street prices; actual price may vary. Power Computing sells direct, so the prices listed here are the ones you would actually pay. Unless otherwise noted, all systems include a keyboard and mouse, but not a monitor or modem. Apple systems do not include a keyboard except for Performa and PowerBook models. DayStar systems do not include a hard drive, RAM, keyboard, or mouse, although we add their cost in determining the prices reported here.

For price comparisons, figure on spending about $800 for a monitor and, if they're needed, $175 for a 28.8-Kbps or 33.6-Kbps modem, $100 for an extended keyboard, $50 for a mouse, $750 for a 2GB hard drive, $125 for 2MB of VRAM, and $275 for 16MB of RAM.

OFFICE SYSTEM

Editors' Choice

★★★★/7.3 **PowerCenter 150** A great price, plus more expansion and better performance than Apple's Power Mac 7600/132, make the PowerCenter 150 minitower the ideal general-purpose office Mac for most people. Power Computing does skimp on the video RAM but is generous on the cache. Power Computing (512/388-6868): $2095, 16MB RAM, 512K cache, 1MB VRAM (4MB maximum), 1.0GB hard drive, 8× CD, 3 free drive bays, 3 PCI slots. *Dec 96, p. 106*

Editors' Choice

★★★/6.9 **SuperMac J700/180** Top speed for an office Mac and good expansion capabilities distinguish this desktop system from others. It's a bit pricey, but the extra money gives you a real performance difference. Umax Computer (510/226-6886): $3095, 16MB RAM, 512K cache, 2MB VRAM (4MB maximum), 2.1GB hard drive, 6.7× CD, 2 free drive bays, 4 PCI slots. *Feb 97, p. 37*

★★★/6.2 **Power Macintosh 7600/132** Thanks to a recent price reduction, Apple's flagship office Mac is now only $200 more than the PowerCenter 150. While the 7600 is a bit slower and less expandable than the PowerCenter, it is nonetheless a strong performer. An added bonus for some people is the built-in video-input circuitry. Apple Computer (408/996-1010): $2295, 16MB RAM, 256K cache, 2MB VRAM (4MB maximum), 1.2GB hard drive, 8× CD, 1 free drive bay, 3 PCI slots. *Dec 96, p. 106*



Apple's PowerBook 1400cs is no dream notebook, but at least it's a stable system and supports CDs.

PORTABLE SYSTEM

Editors' Choice

None Apple's portables have been lackluster recently, and none warrants this ultimate recommendation.

★★★/6.4 **PowerBook 1400cs/117** Apple's newest notebook accommodates an optional CD-ROM drive. The result is a better system than the old 5300 series, but no barn burner. The new, larger LCD screen is nice, even though it's passive matrix. Apple Computer (408/996-1010): $2495, 12MB RAM, 750MB hard drive, optional 6× CD, 11.3-inch passive matrix LCD, 1 drive bay, 2 PC Card slots ($3500 model 1400c/117 has active matrix LCD and 1.0GB hard drive). *Jan 97, p. 58*

★★★/5.9 **PowerBook Duo 2300c/100** A lot of power in a small package, this system could double as a desktop if you use a docking station. However, it's not cheap. Apple Computer (408/996-1010): $4699, 20MB RAM, 1.1GB hard drive, 14.4-Kbps modem, 8.5-inch active matrix LCD. *Apr 96, p. 58*

SMALL-OFFICE/HOME-OFFICE SYSTEM

Editors' Choice

★★★★/7.6 **PowerBase 240** Pro-level performance for a price comparable to that of Apple's Performa 6400/200, plus a strong selection of features and greater expansion capability, make this tower a great buy for consultants and small businesses. Power Computing (512/388-6868): $2295, 16MB RAM, 256K cache, 2MB VRAM (4MB maximum), 1.2GB hard drive, 8× CD, 3 free drive bays, 3 PCI slots. *Jan 97, p. 60*



For features, performance, and price, Power Computing's PowerBase 240 is a winner on all counts.

★★★★/7.4 **Performa 6400/200** Good performance contrasts with limited internal expansion. But a good price makes this tower more attractive despite its limitations. A unique feature is its TV tuner slot. Apple Computer (408/996-1010): $2119, 16MB RAM, 256K cache, 1MB VRAM (1MB maximum), 2.4GB drive, 8× CD, 1 free drive bay, two 7-inch PCI slots, TV/FM tuner slot, 28.8-Kbps modem. *Dec 96, p. 106*

EDUCATION SYSTEM

Editors' Choice

★★★★/7.3 **PowerBase 180** Strong performance for a low price, plus good expandability and features such as 3-D video acceleration, make this tower a great buy for cash-strapped schools and students. Power Computing (512/388-6868): $1595, 16MB RAM, 256K cache, 2MB VRAM (4MB maximum), 1.2GB hard drive, 8× CD, 3 free drive bays, 3 PCI slots. *Jan 97, p. 60*

Editors' Choice

★★★★/7.1 **Power Macintosh 5400/180** This all-in-one Mac—available only to schools—eliminates the need for several cables that could get damaged or stolen in a school setting. Rich in features—including a good monitor—and moderate in speed, the 5400 is a good class-

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Outstanding ★★★★★ = 9.0–10.0 Very Good ★★★★ = 7.0–8.9 Good ★★★ = 5.0–6.9 Flawed ★★ = 3.0–4.9 Unacceptable ★ = 0–2.9

room Mac. Apple Computer (408/996-1010): $1999, 16MB RAM, 1MB VRAM (1MB maximum), 1.6GB hard drive, 4× CD, no free drive bays, 7-inch PCI slot, TV/FM tuner slot, Ethernet card, internal stereo speakers, monitor included.

IMAGE-EDITING AND 3-D GRAPHICS SYSTEM

Editors' Choice

★★★★/7.4 **Genesis MP 720+** The ultimate Mac system speeds through multiprocessor (MP)–enabled programs like Adobe Photoshop and Strata StudioPro Blitz. Its high expandability means you could equip it with an internal RAID system and a recordable CD-ROM drive and still have free bays. The oversize tower is a bit imposing, but it leaves room for everything you might need. DayStar Digital (770/967-2077): $10,714, 16MB RAM, 512K cache, 4MB VRAM (4MB maximum), 2.0GB hard drive, 8× CD, 7 free drive bays, 6 PCI slots. *Dec 96, p. 120*

★★★★/7.5 **Power Macintosh 9500/180MP** A solid second in performance at half the price—a terrific deal for pros who need a multiprocessor system. The case doesn't hold as much as the Genesis MP's, and it's not as easy to add internal peripherals, but it's still sizable. Apple Computer (408/996-1010): $5199, 32MB RAM, 512K cache, 2MB VRAM (4MB maximum), 2.0GB hard drive, 8× CD, 2 free drive bays, 6 PCI slots. *Dec 96, p. 120*

★★★★/7.2 **Genesis MP 360+** Like the Genesis MP 720+, the MP 360+ features a cavernous tower case to hold an impressive array of peripherals. Like the 9500/180MP, it offers strong performance at a



Umax's SuperMac S900/225 is a close second for ultimate speed at a lower price than the top performer.

lower price than the 720+. But the 9500/180MP is a better deal unless you need the internal expansion. DayStar Digital (770/967-2077): $7814, 16MB RAM, 512K cache, 4MB VRAM (4MB maximum), 2.0GB hard drive, 8× CD, 7 free drive bays, 6 PCI slots. *Dec 96, p. 120*

PUBLISHING AND DESIGN SYSTEM

Editors' Choice

★★★★/8.0 **SuperMac S900/225** Nearly as fast as Power Computing's PowerTower Pro 225 for a significant $700 less, and with an extra free drive bay, the SuperMac S900/225 is the best high-performance deal around. The S900 also has an easier-to-upgrade case design than competing Apple and Power Computing towers. Expect availability to be limited until late winter 1997 as chip production ramps up. Umax Computer (510/226-6886): $4295, 32MB RAM, 512K cache, 8MB VRAM (8MB maximum), 2.1GB hard drive, 8× CD, 4 free drive bays, 6 PCI slots. *Dec 96, p. 120*

Editors' Choice

★★★★/7.9 **PowerTower Pro 225** The fastest single-CPU Mac offers the top performance needed for publishing pros. For many people, the $700 extra cost compared to the Umax SuperMac S900/225 won't be worth the 5 percent faster performance. Although the included Speed Doubler software increases the Pro 225's performance difference, you can buy that software for about $70 and still pocket more than $600 in savings. Power Computing (512/388-6868): $4995, 32MB RAM, 1MB cache, 8MB VRAM (8MB maximum), 2.0GB hard drive, 8× CD, 3 free drive bays, 6 PCI slots. *Dec 96, p. 120*

★★★★/7.8 **SuperMac S900/200** Running close behind the 225MHz Macintoshes at a great price, this system is an excellent choice for the cost-conscious power user. Umax Computer (510/226-6886): $3795, 32MB RAM, 512K cache, 8MB VRAM (8MB maximum), 2.1GB hard drive, 8× CD, 4 free drive bays, 6 PCI slots. *Dec 96, p. 120*

MULTIMEDIA AND VIDEO CREATION SYSTEM

Editors' Choice

★★★★/7.4 **Genesis MP 720+** The ultimate Mac system speeds through multiprocessor (MP)–enabled programs like Adobe Premiere and After Effects. Its oversized tower case's high expandability means you could equip it with an internal RAID system and a recordable CD-ROM drive and still have free bays. DayStar Digital (770/967-2077): $10,714, 16MB RAM, 512K cache, 4MB VRAM (4MB maximum), 2.0GB hard drive, 8× CD, 7 free drive bays, 6 PCI slots. *Dec 96, p. 120*

WEB AND INTRANET SERVER SYSTEM

Editors' Choice

★★★★/7.8 **SuperMac S900/200** With great performance at a great price, plus a simple-to-upgrade case design and plenty of expansion capability, this system is well suited to being a departmental intranet or moderate-demand Web server. Umax Computer (510/226-6886): $3795, 32MB RAM, 512K cache, 8MB VRAM (8MB maximum), 2.1GB hard drive, 8× CD, 4 free drive bays, 6 PCI slots. *Dec 96, p. 120*

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**Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) **Had less than 32MB of RAM, so some tests were conducted with virtual memory, which slows performance. ***Available only to educational institutions.*

Behind Our Tests

For details on our methodology, see *Mac Superguide*, January 1997.—**Macworld Lab testing supervised by Mark Hurlow**

★★★/6.8 **Power Macintosh 9500/200** A bit pricey for a server, the 9500/200 did offer the best Net server performance in Macworld Lab tests, edging out the less-expensive SuperMac S900/200. Apple's recent price cuts, though, make the price difference less of an obstacle to choosing the 9500. Apple Computer (408/996-1010): $4195, 32MB RAM, 512K cache, 2MB VRAM (4MB maximum), 2.0GB hard drive, 8× CD, 2 free drive bays, 6 PCI slots. *Dec 96, p. 120*

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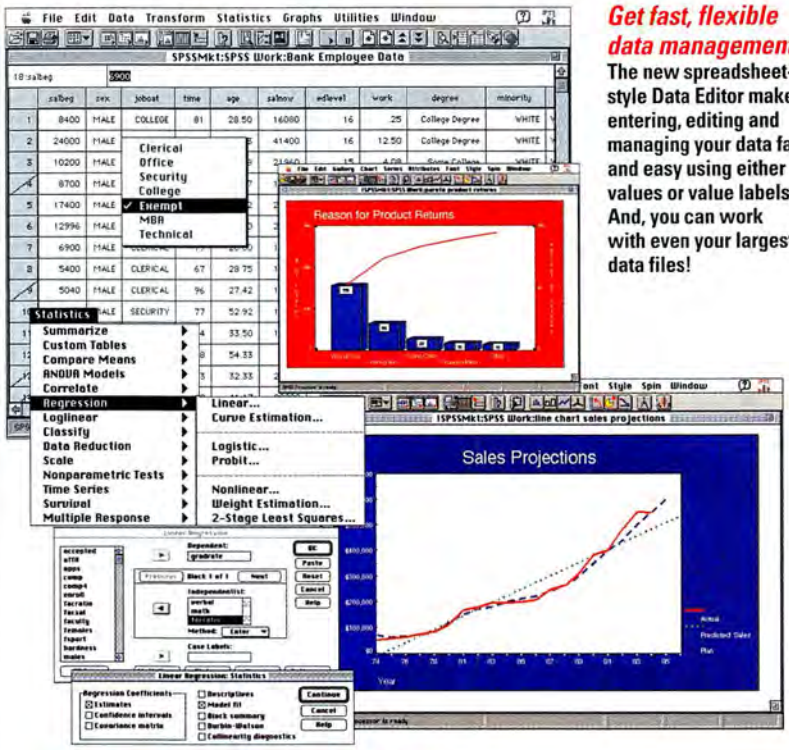
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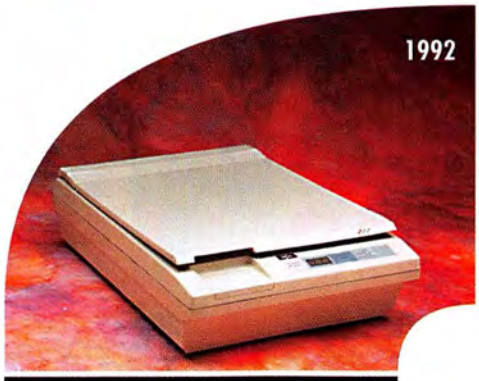
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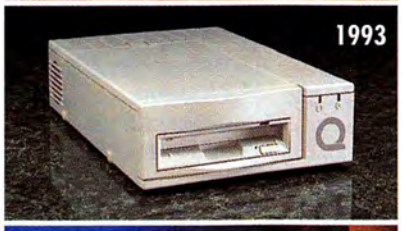
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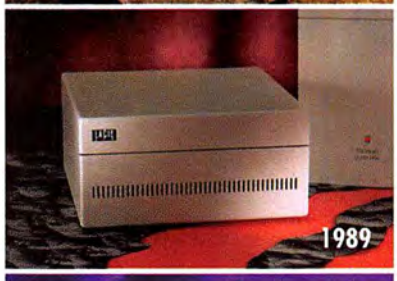


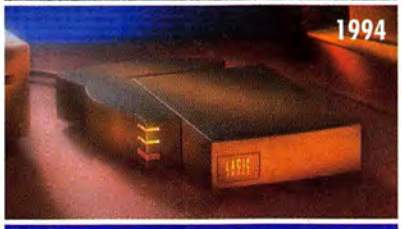














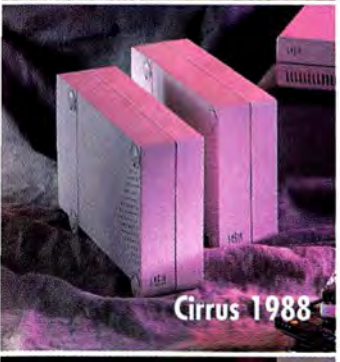
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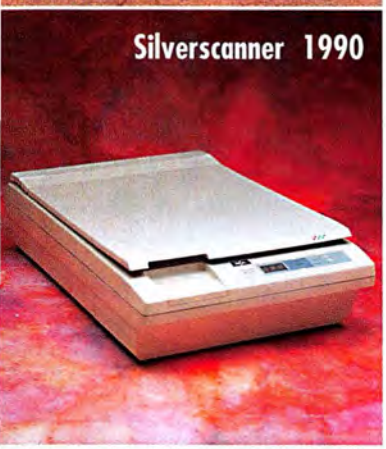
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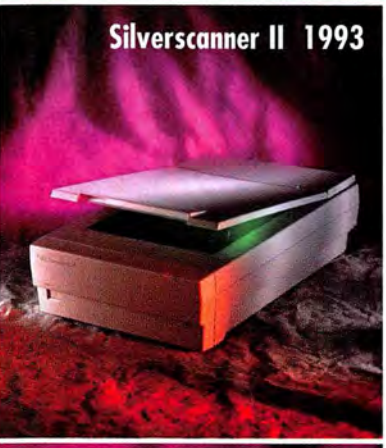
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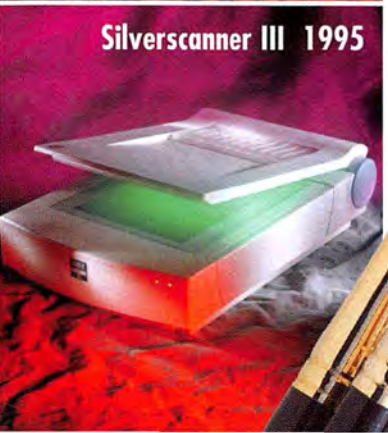
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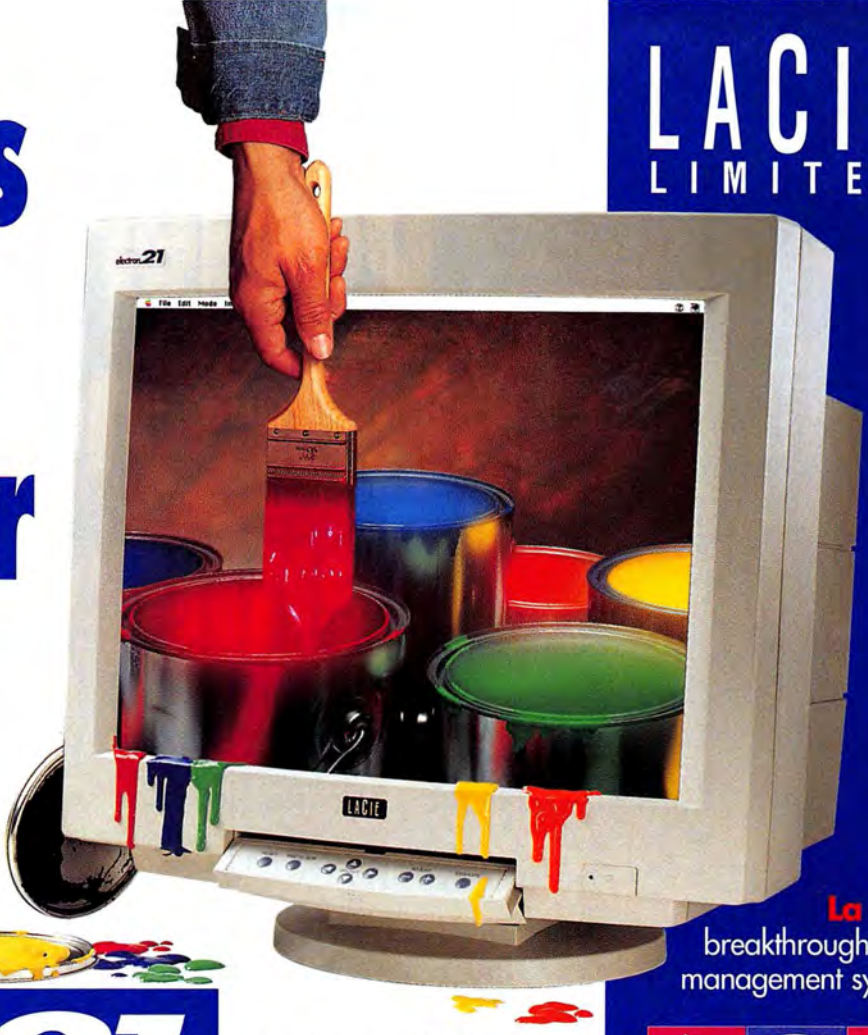


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Time for a New OS?

Mac OS got you down? Considering NT? Should you wait for the Be OS?

by Galen Gruman

DESPERATE TIMES, DESPERATE MEASURES. That's what Apple faced this fall, after its Copland operating system strategy fell apart (see "Mac OS 8: Back to Square One," *Macworld*, November 1996), leaving the Mac with no significantly new OS in sight for several years at a time of crushing competition from Microsoft's Windows 95 and NT.

Into this period of uncertainty comes a potential white knight, a new OS for the Mac developed by a group of Apple refugees at Be, Inc., led by former Apple product-development chief Jean-Louis Gassée. The Be OS provides many of the features promised for Copland (the former code-name for Mac OS 8): protected memory, preemptive multitasking, multithreading, and an all-native code base. But it lacks one key attribute: compatibility with today's Mac programs.

To listen to the people at Be, or to the popular media, it seems inevitable that Apple would purchase or license the Be OS and use it in place of Copland as Mac OS 8. That would be a major shift for all of us—forcing us to update all of our software or switch back and forth between the Be OS and System 7—but would give the Mac the next-generation OS platform that many believe is essential to the Mac's survival. However, sources close to Apple tell *Macworld* that Apple likely won't buy the Be OS, even though it may license some Be OS components (see the sidebar "What Is Apple's Mac OS strategy?"). To follow this developing story, be sure to check *Macworld*'s Daily News at *http://www.macworld.com/cgi-bin/pages.pl/daily/dailynews.main.shtml/* for the latest.

Apple CEO Gilbert Amelio admits that the two companies are discussing possible partnership or licensing arrangements that could result in some Be OS technologies' making their way into the next Mac OS. Be is also discussing licensing the Be OS to Motorola Computer and other clone makers (Power Computing already has a

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Play Options View Control
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Palette Iterations
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license); Gassée said he would be willing to license to everyone but Apple if Apple balks.

Behind the Scenes

A couple of years ago, the Mac had a good OS and slow hardware. Then the PowerPC came to the rescue, and with continuing speed increases today and more expected in the next few years, the Mac hardware platform is at least as good as PC hardware. Now it's the Mac's longtime advantage—the OS—that's failing us. Today, the Mac has good hardware and a slow OS.

Copland was supposed to change that by throwing out the guts—called the microkernel—of the decade-old Mac OS and replacing it with NuKernel, a microkernel based on the Mach OS, a variant of Unix favored by engineers. But something went wrong—Apple focused so much on backward compatibility with Systems 6 and 7 that it stymied Copland's development and essentially weighed the OS down until it sank under the load. The problem isn't NuKernel, but all the OS components loaded on top of it to both provide new features and support all of today's applications.

The Be OS is different. Unfettered by compatibility with 680X0 processors, applications, and the Mac OS in general, the Be OS looks to be a powerhouse, one that can rival Windows NT in multimedia authoring, image editing, 3-D graphics, and video production:

- The Be OS is preemptively multitasking, so programs can run simultaneously yet smoothly.
- It has memory protection so one errant program won't bring down others or the OS.
- It automatically takes advantage of multiple CPUs so programs don't have to be multiprocessor-aware. Its architecture is designed to keep drivers and programs from crashing each other.
- It has a stylish new interface.

In short, the Be OS sounds a lot like what Copland was supposed to be.

Like Copland, the Be OS uses a new microkernel. But that's not what makes it attractive to Apple. Be's kernel and Apple's NuKernel are not very different. What Be brings to the table is the rest of the OS—the equivalents of the Mac's Toolbox routines, extensions, and managers, which provide all the services you and your programs rely on. Because the Mac OS has evolved over 14 years, it has a lot of patches, exceptions, and tricks in its OS services made to ensure compatibility. The Be OS, by contrast, is streamlined. It offers clean services without all the patches. This should make it more efficient and more stable.

Momentum for Be

Three months ago, Be showed the Be OS running on a Power Computing PowerCenter system. Since then, the Mac industry has been abuzz over the possibility: forget Copland and adopt the Be OS as the next Mac OS. Apple's negotiations with Be about a possible deal or buyout have been fueling those cries.

There is more momentum behind Be as well:

- Power Computing plans to ship the Be OS free with at least some models it sells starting in January 1997 (in addition to the Mac OS, of course). On these systems, you can boot the Be OS after booting the Mac OS, letting you switch back and forth. It's clear that Power Computing has been pushing the Be option by first helping Be port its original OS to the Mac and then showing off the Be OS at the August 1996 Macworld Expo.



A Boost for Be A big advantage for a new operating system is a choice of boxes. The Be OS now runs on the company's own platform, as well as on Power Computing machines that also run the Mac OS.

- Metrowerks, the compiler company that saved the Power Mac by providing the first—and for a long time the only—native compiler so companies could write native Power Mac programs, has added Be support to its latest CodeWarrior programming environment. This could encourage many Mac developers to at least consider Be OS versions, since they could reuse much of their Mac code for a Be OS version.
- Adobe Systems is working on a Be-for-Mac version of Photoshop, in a bid to get around the Mac OS's speed limits while still providing a Mac version. (The company would not confirm this, saying only that it was exploring its options.)
- Other companies, including Quarterdeck and SoftArc, are also considering Be-for-Mac versions of their products. The companies that have had to port to Windows NT because of System 7's bottlenecks would likely adopt the Be OS first. The products of these companies drive authoring, rendering, imaging, and networking—QuarkXPress, Macromedia Director, Adobe After Effects, EveryWare Butler, Quarterdeck StarNine WebStar, and SoftArc FirstClass.

But—and it's a big but—the Be OS doesn't run Mac programs, and it doesn't have several key Apple technologies, or equivalents, that would be essential for Mac developers to offer Be OS versions of their Mac software.

What's missing? A network-abstraction architecture like Open Transport, as well as personal file sharing (like AppleShare) and a network file system. Scripting, agents and other active-assistance technology, and a component architecture like OpenDoc. Mac-quality printing services, including PostScript drivers, desktop printing, and *n*-up printing. A complete multimedia architecture like the QuickTime Media Layer. Be could develop these components or perhaps license them from Apple to bring to the Be OS, but that won't happen overnight.

Be's Possible Paths

Could the Be OS be the next Mac OS? Or is the Be OS just another OS that will enjoy a little fame and then join other wannabes like the Next OS, OS/2, AmigaDOS, and GEM? Or will Be take a third route—that of the high-end OS for Mac systems, similar to NT's path on the PC platform?

Be as the Next Mac OS Forget Copland and go with Be—that's what some Mac enthusiasts urge as they hear about 1999 as a realistic date for when the major Mac OS rewrite needed to compete with Windows NT will ship.

True, the Be OS has many of Copland's promised features, but the Be OS is not complete—Be engineers still have a fair amount of work to do in adding file services, network services, and other key components. That was clear to *Macworld* when we worked with a prototype version and found its core services just half-built. While the first shipping version of the Be OS is expected soon, don't be surprised if it needs some updates and improvements. In fact, Be plans to ship twice-a-year upgrades on a subscription plan.

More important, the Be OS won't run any Mac programs, and the number of commercial programs now available on the Be OS is zero. The latter problem could be alleviated if Adobe ships Photoshop for the Be OS and other companies follow suit with critical programs. But that will take a year or more to reach critical mass in just those specialty areas.

The first problem is trickier—none of the programs that you use today would be available to you if you switched to the Be OS. The engineers at Be don't have a magic answer to this problem. There are two options they could pick, and both have strong drawbacks.

The first option is to write a Mac emulator—basically a port of the Mac OS that runs within the Be OS and that itself runs a Mac program within it. A user would not see the Mac OS; instead, double-clicking on a Mac application's icon would launch the program within a Mac OS "wrapper." The downside is that the Mac program could not take advantage of extensions or interapplication communication with other Mac programs that might be running, which means it would lose functionality or not run at all.

The second option is for Be to create a full or nearly full Mac emulation or port that would run Mac programs just like the Mac OS. This would be essentially a port of the Mac application programming interfaces (APIs) to the Be OS's inner core, the microkernel. Sound familiar? That's because this is exactly what Apple needs to do to port the current Mac OS to the NuKernel microkernel chosen for Mac OS 8. The API port would take Be several years—longer than it will take Apple to finish its work on Mac OS 8.

While they're cagey about the discussions with Apple on the Be OS's future, the engineers at Be indicate that they don't like either option. They're not interested in replacing Copland with a Mac OS–compatible version of the Be OS. They'd rather see people adopt their OS and run Be OS–native software. Still, Be and Apple seem to be heading to the conclusion that if the

Multiprocessing Built In The Be OS supports two CPUs without needing a special extension or software; the final version will support as many as four CPUs.

Dock Like the Apple menu, the dock gives you quick access to the files, folders, and programs you use frequently. However, the Be OS won't let you put items on the desktop.

Trash No modern OS would be complete without a copy of the Mac's venerable and recognizable Trash Can.



People, Places, and Things The Be OS uses a database as its file system, so it can track attributes. This means it can easily find files of a certain date or created by a certain program. Be has used this same approach to make information about people—such as names, address, and phone numbers—accessible throughout the OS. This means that all sorts of programs—PIMs, remote access administrators, fax managers—can use the same information, making updating easy for you. Likewise, you can search for attributes throughout the system.

Workspaces The Be OS lets you create multiple workspaces—computers within the computer—so you can have several tasks running in parallel without their taking up the screen. Be or Apple might also use workspaces to run a separate Mac emulator.

System Applets The Be OS includes several utilities and games, including a CD player, Web browser, Unix command shell, and SCSI bus probe. The Be OS also uses the iconic approach to disks, folders, files, and programs.

Context-Sensitive Menus By clicking the right-hand mouse button on a BeBox, or a yet-to-be-defined keyboard/mouse combination on the Mac, you get a pop-up menu showing options for the selected item.

How Do the Operating Systems Compare?

The Be OS has much that the Mac OS doesn't—and vice versa

EVERYTHING ABOUT the Macintosh inspires passion, and this latest brouhaha about which operating system to use is no exception. One side believes Apple should scrap its plans for Mac OS 8 and replace it with the Be OS. Other, equally fervent believers contend that Apple should concentrate on finishing what it started with Mac OS 8. Perhaps the best solution lies somewhere in between.

Why are some developers so enamored of the Be operating system? For starters, it uses the latest OS technology and offers many features that even Mac OS 8 can't. With protected memory, if one Be application crashes, it won't bring down the entire system. With Mac OS 8, it is still possible for one application to crash all the others. Also, because each window in a Be application operates in its own thread and is preemptively scheduled, you would, for example, be able to open multiple Adobe Photoshop files and simultaneously run a different filter on each of them while copying files in the background—and still have a responsive system.

The Be OS also fully supports multiprocessing systems, unlike Mac OS 8, where cooperatively scheduled tasks (that is, anything using the Toolbox) cannot run on different processors.

These features were not scheduled for Copland mainly so that it could retain backward compatibility with current applications. For Apple to integrate them into the Mac OS now would cause another long delay in its schedule.

But Who's Going to Build It?

All these features sound great—but no platform can be successful unless developers embrace it. If Apple were to replace Mac OS 8 with the Be OS, its developers would have to rewrite their applications to be compatible with, and take advantage of, the new operating system. The developers would also have to familiarize themselves with C++ and object-oriented programming.

Even facing this challenge, many developers are excited about Be. Several have noted

Be OS versus Mac OS: Technology Differences

	Mac OS 8 (original plan)	Mac OS 8 (new plan)	Be OS
CORE SYSTEM SERVICES			
Preemptive multitasking	partial	likely full	full
Protected memory	partial	likely full	full
Multithreading	partial	likely full	full
Extensions architecture	full	System 7 programs only	partial
Agent technologies	full	partial	no
CPU support	68030 and 68040; PowerPC 601, 603, 604 series	68030 and 68040; PowerPC 601, 603, 604 series	PowerPC 603, 604 series
System support	all Macs with above CPUs	all Macs with above CPUs	Macs based on the Power Mac 7200, 7500, 8500, 9500 architectures; CHRP-based Macs
Multiprocessor support	through DayStar extension	likely full	full
Dynamic search engine for objects	yes (V-Twin)	yes (V-Twin)	yes (Storage Server)
APPLICATION SERVICES			
Drag and drop	yes	yes	yes
Interapplication communication	yes (Apple events)	yes (Apple events)	yes (Application Kit)
Multilingual support	yes (WorldScript)	yes (WorldScript)	planned for later version (Unicode)
Customizable interface	yes	yes	possible
Scripting	yes (AppleScript)	yes (AppleScript)	possible through add-on product (Frontier)
NETWORKING AND COMMUNICATIONS			
Networking	AppleShare, some Internet protocols	AppleShare, some Internet-based protocols	Internet protocols
Network abstraction	Open Transport	Open Transport	Network Kit
Remote access	yes	yes	only through Internet
MULTIMEDIA, GRAPHICS, AND PRINTING			
3-D rendering engine	yes (QuickDraw 3D)	yes (QuickDraw 3D)	yes (OpenGL); port of QuickDraw 3D under discussion
Motion-video playback	yes (QuickTime)	yes (QuickTime)	partial (Media Kit); port of QuickTime under discussion
Audio and MIDI	yes (QuickTime)	yes (QuickTime)	yes (MIDI Kit)
Gaming architecture	yes (GameSprockets)	yes (GameSprockets)	yes (Gaming Kit)
Font rendering	PostScript, TrueType	PostScript, TrueType	TrueType; PostScript planned
Printing	PostScript, QuickDraw	PostScript, QuickDraw	HPGL; PostScript planned
Multiple monitors	yes	yes	no

how easy the Be OS is to code for, even going so far as to describe programming for the Be OS as "fun," a word not usually associated with writing Macintosh applications. The Mac OS, from years of evolution, carries a lot of baggage, and developers often complain about how much work it takes to support the system and create even the most basic application. The Be OS itself handles much of the basic work of application development, from handling event loops to creating threads. The APIs that developers need to communicate with the operating system are much simpler than the Mac's. Documentation for the Be OS is considerably more concise than Apple's for the Mac OS, freeing the developer to concentrate on implementing its program's features.

Of course, there's a simple explanation for some of Be's programmatic simplicity: it doesn't support many, often complex, technologies that form the core of what we take for granted in the Mac OS. Remote Access, desktop printers, multilingual support, and use of multiple monitors are all unavailable in the Be OS. Some technologies that already exist in cross-platform versions—such as the QuickTime Media Layer and OpenDoc—may be relatively easy to port to the Be OS. Some Mac-specific technologies are another matter altogether. OpenTransport, for instance, is not currently platform-independent, nor does Apple plan to make it so. Given how difficult it was to incorporate Open Transport into System 7.5.X, it probably won't integrate easily into a new environment.

Apple is unlikely to support an OS that does not offer these features. However, migrating the features into the Be OS would more likely than not take several years—perhaps as long as it would take Apple to finish implementing them for Mac OS 8. Finally, once these Mac features are ported over, the Be OS's advantage of API simplicity, the very reason many developers would embrace Be, will have been erased.

Interface Problems

There is also the issue of the user interface. Apple's Human Interface Team works very hard to ensure that Macintosh users are presented with a consistent and easy-to-use interface. Be's interface lacks a universal menu bar, which may shock many Mac OS users. In fact, some applications do not even have a menu bar—quitting the application requires that you go to a menu attached to Be's version of the Launcher. The use of the two-button mouse, while well implemented in places, is not always consistent from application to application. Nor will the Be OS readily support customized views and appearances.

To create a hybrid Mac-Be OS, both companies would need to sacrifice. Apple would need to abandon application compatibility (but if it were willing to do that, it probably could have shipped Mac OS 8 by now). Be would have to sacrifice its API simplicity. It may serve both companies better to merely collaborate on new developments.

Be OS becomes Mac OS 8, a Mac compatibility window is the option they'll pick.

Be as a Mac OS Alternative What Be seems to want—and the option that I believe gives Be the best shot for success—is to coexist with the Mac OS, in a way similar to how Windows NT coexists with Windows 95. And Apple seems to agree.

The Be team likes to compare its OS to the Amiga, the multimedia wonder of the early 1980s that gained a fanatical following (Mac owners look like PC owners when put up against Amiga owners) in the music and video crowd. The Amiga failed, but the Be team says that's because the technology was premature—15 years ago, there weren't hard drives big enough, CPUs fast enough, memory cheap enough, or peripherals capable enough to handle digital audio and video. Today, there are.

The Be team also sees the high-end multimedia crowd as its entrée into the Mac's traditional stronghold. The strategy is—and Be officials will politely confirm this if asked—to take over the high-end users who once drove the Mac's innovation. First Photoshop, then media authoring, then publishing, then Internet serving. That leaves the hobbyists and office users, who can stick with the Mac OS, use Windows NT, or wait until the Be OS squeezes out the Mac OS (if it does).

While some people position Be as the savior for the Mac, a successful Be OS could in fact marginalize the Mac OS, leaving the Mac hardware platform in place but replacing its soul. That's why it would make the most sense for Apple—if it wants to use the Be OS as the foundation for the next Mac OS—to buy Be and subsume it, rather than merely license it and watch control over the Mac OS slip to another company.

Ironically, Apple had a similar opportunity three years ago, when its engineers ported the Mac OS to the 80486 chip and got it to outperform the 68040 Macs of the day. This was before Windows 95. A Mac OS for PCs could have squeezed out Windows, which had suffered for years through terrible implementations and was only just getting a decent version (3.1). Apple's management at the time decided not to move forward with the Mac OS for the PC, and the rest is history.

The Be OS's potential to rescue the Mac platform by slowly easing out the Mac apparently has not been lost on Apple's current management, leading to the licensing and acquisition discussions with Be. (This is also the strategy that Microsoft is using to replace Windows 3.1 and 95 with Windows NT.)

With or without Apple's support, Be has a shot in getting the Be OS onto the Mac platform. What's needed are a few key programs like Photoshop and the ability to run the Mac OS and the Be OS separately but simultaneously, requiring you to switch windows or change view modes—similar to how SoftWindows or DOS-card users switch between the Mac OS and Windows. Add Power Computing's distribution of an affordable package from Be with its new systems, and it could be common among high-end users to use the Be OS on their Macs, even if their business software and utilities remain on the Mac OS.

If Apple buys Be, it could follow the same strategy, providing a high-end OS and a midrange OS simultaneously for a few years, giving developers time to port to the Be OS.

There are four possible barriers to this complementary-OS scenario:

- Apple shuts down Be by acquiring it and halting development. This seems extremely unlikely.
- The Be OS turns out to be weaker than it first appears

What Is Apple's Mac OS Strategy?

Don't look for the Be OS to become the Mac OS anytime soon

AS WE GO TO PRESS, Apple has been discussing possible use of Be technology, but it appears unlikely that the company will buy the Be OS and use it as the platform for Mac OS, according to sources close to Apple. Instead, the company is evaluating technologies from several sources—within Apple, at Be, and elsewhere—for adoption into Mac OS 8.

The New Mac OS 8 The company has also figured out a new strategy for Mac OS 8. This calls for Mac OS 8 to have three basic components: the microkernel that provides the basic file-management, networking, and computational services; the modern application programming interfaces (APIs) and services expected in Copland and its original follow-on, Gershwin; and the System 7 APIs that ensure compatibility with today's programs. Examples of APIs include QuickTime, QuickDraw 3D, Open Transport, and OpenDoc.

Apple's new plan lets Mac OS 8 run most of today's programs, including system extensions (which the original Copland did not support).

Among the Mac-compatibility options being explored at Be for the Be OS is to create the equivalent of a SoftWindows or Macintosh Application Environment—a separate workspace that runs Mac applications isolated from Be applications. Apple's approach won't erect such a wall. Instead, System 7 programs will use System 7 APIs, while Mac OS 8 programs will use Mac OS 8 APIs.

This is similar to how Apple let PowerPC and 680X0 applications coexist on Power Macs. It differs from the original Copland approach to compatibility, which tried to graft modern OS services onto today's System 7 APIs. That effort compromised both compatibility and the effective use of modern OS services.

Under Apple's new plan, system extensions would run, but only System 7 programs could use them. Mac OS 8 programs would not use extensions. This scheme lets Mac OS 8 programs be separate tasks in the OS, with their own protected memory. Even the original Copland didn't go that far—it was the Gershwin OS that was planned to offer memory protection for each program.

For users, the difference between Mac OS 8 and System 7 programs would be largely invisible. The programs would simply use the APIs they needed, and not be affected by the other ones. Thus a System 7 program would need to use the DayStar multiprocessing API to take advantage of multiple CPUs, while a Mac OS 8 program would use the new SMP API. This lets Apple focus on using advanced technology for Mac OS 8 programs without needing to lard the Mac OS 8 APIs with features for System 7 programs. Having essentially two OSs in one will likely make the System Folder significantly bigger, but that's a small price to pay.

Where Apple Stands The microkernel is mostly done, and the System 7 APIs are of course done. That leaves the modern OS components plus the glue needed to have the modern OS and System 7 OS coexist in Mac OS 8.

Obviously, developing all the new technologies will take some time, since Apple can't use most of the Copland APIs so far developed. Sources close to Apple say the company is also shopping around for needed technologies, looking to buy technologies that are further along than Apple's internal efforts. One example: the Java Virtual Machine, an API that Sun has already written.

Apple has no estimated time for releasing Mac OS 8, although late 1997 or early 1998—not 1999—seems increasingly likely given the new approach.

when industrial-strength programs get ported to it, either discouraging further software ports or making Be OS users decide to stay with the Mac OS—or jump from the Mac platform altogether in favor of Windows NT. This is more possible, since the Be OS remains untested in a real-world setting and lacks several Mac technology advantages.

• The arrival of Common Hardware Reference Platform–based Macs in 1997 makes it easy for Macintosh users frustrated with the Mac OS's poor performance to switch to Windows NT—on their CHRP Macs, which will support both OSs. In this scenario, the Be OS offers few benefits over NT, giving the established NT the ultimate advantage. What the Be OS does provide in this scenario is a way for Apple, or at least the Mac platform, to remain independent of the Microsoft hegemony, if Apple or Be can start migrating key Mac programs and technologies to the Be OS.

• Apple develops its own Mac OS 8. For the first time in months, I think this is very possible.

The Last Word

The Be OS has rekindled some of the excitement the first versions of Copland created two years ago. It even has a chance to save the high end for the Mac platform, if not for the Mac OS. But it's a new, untested OS that could soon be battling with Windows NT directly. My bet—short of Apple's acquiring Be—is that the race will continue to be between Windows (NT) and Mac OS (8). The Be OS has a chance, and exploring it won't cost you any more than the price of the OS itself, the extra drive space, and your time. Beyond that, it's a familiar game for Mac OS watchers: wait and see. **m**

Macworld executive editor GALEN GRUMAN has worked with at least ten operating systems since 1978.

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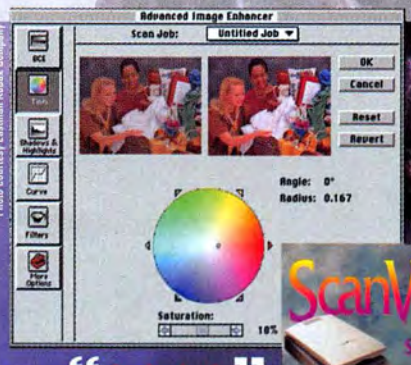


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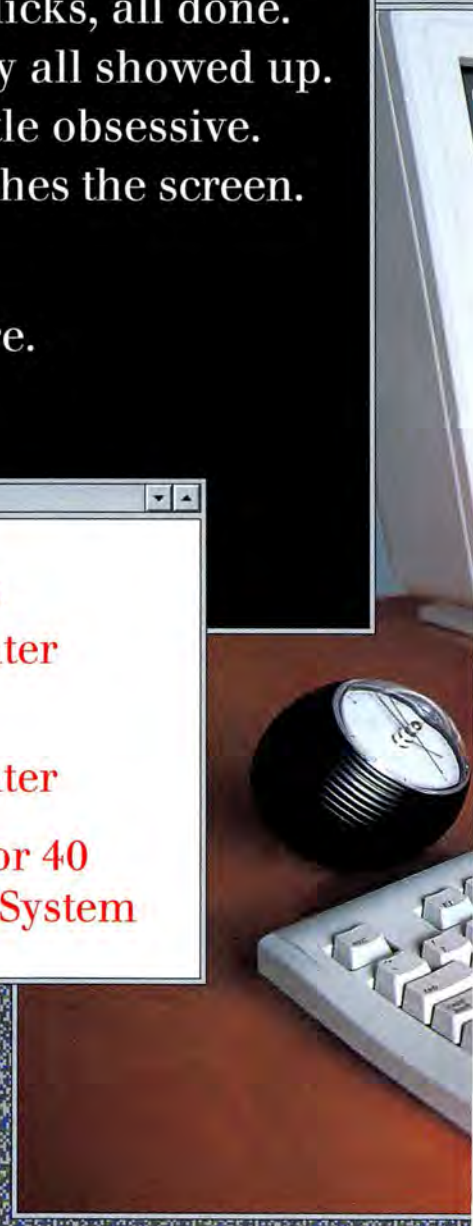
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Revisions? OK, so I'm a little obsessive.
The comp? It actually matches the screen.

5:00 PM What's next? I'm out of here.

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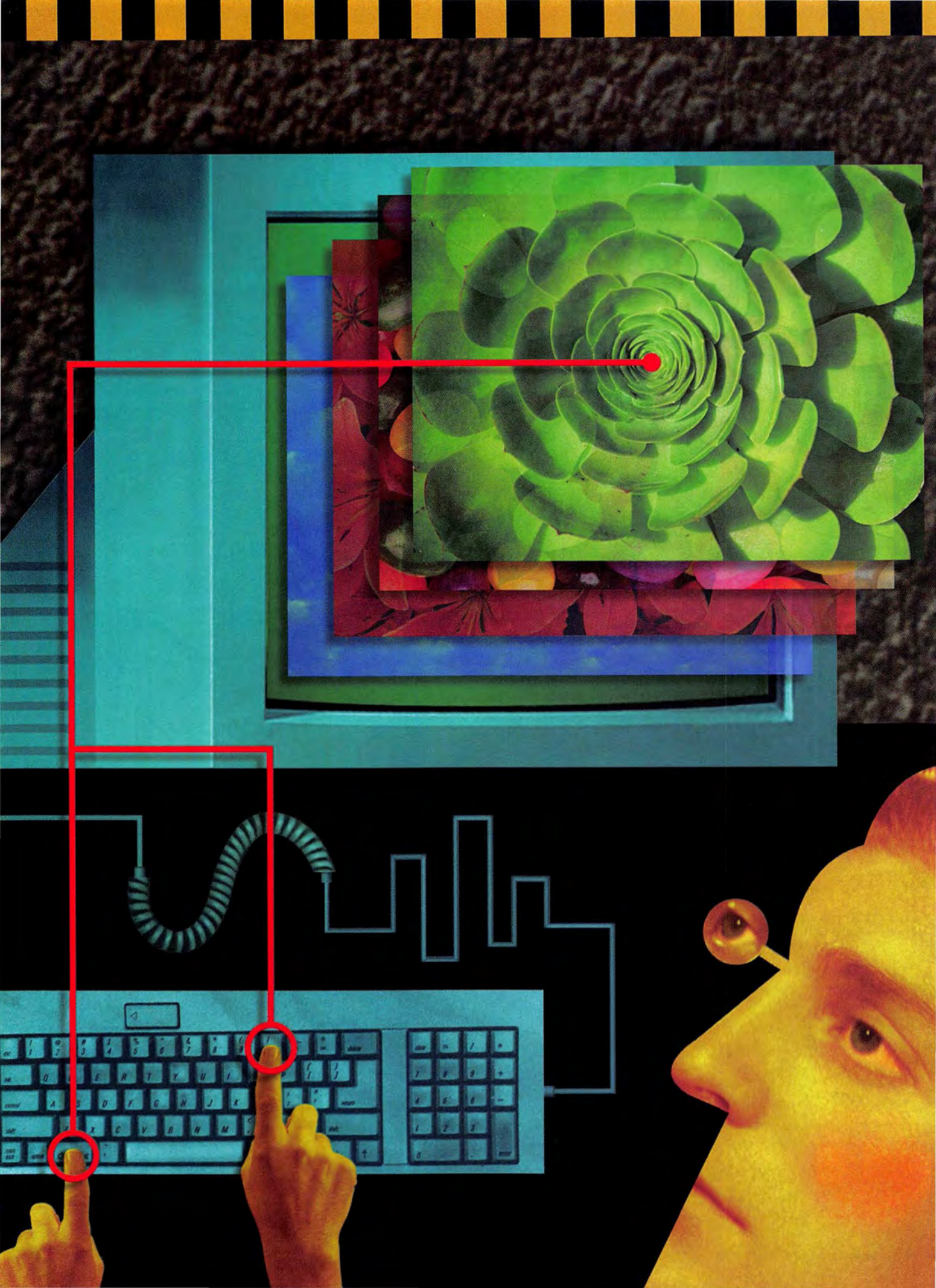
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Our expert guide to the new interface gets you up to speed fast

Photoshop's New Look

by Deke McClelland

SOME OF YOU ARE NOT GOING TO LIKE ADOBE PHOTOSHOP 4. NOT AT FIRST, ANYWAY. If you're the kind of person who uses the application day in and day out, so long and so frequently that you perform hundreds of operations every hour without even thinking, then brace yourself for some serious mental retooling.

I found that lots of low-level operations—the little things you take for granted—have changed. You now press the Y key (instead of P) to select the pencil, ⌘-0 zooms the image to fit the window (where it used to display the full-color composite), you use the option key (not ⌘) to subtract one selection outline from another, and floating selections are all but extinct.

For those of you who just dabble in the program, these references probably sound a bit obscure. But if you're an imaging professional, be forewarned that fully half of Photoshop 4's key-based techniques are either new or different from what they were in version 3 (see the table, "Maximizing Productivity in Photoshop 4").

Yet, despite spending much of my first week with Photoshop 4 cursing at it, I have not only come to terms with this upgrade but consider it a distinct improvement over its predecessor. Granted, its new ways are different, but most of the operations are more logical and more flexible than their predecessors. Though you may have problems believing it initially, virtually the only advantage version 3 has over the improved version 4 is familiarity.

That's why I've chosen to concentrate not only on the new features in Photoshop 4, but also on how to get the most out of the program in the shortest amount of time. I've put together an abridged list of essential navigation, selection, and layering operations that have changed in Photoshop 4, complete with the old ways and the new ways to put these operations to work.

I also outline a couple of techniques that explain how to use two of Photoshop 4's most interesting enhancements: independent color-correction layers and an altogether

GORDON STUDER



Effortless Calculations Rather than go to the effort of correcting the overly dark digital photo shown at top, I merely created a dummy adjustment layer and applied the Screen blend mode. The image was still too dark, so I duplicated the adjustment layer. Despite the addition of these two layers, the image isn't so much as 1K larger in memory. It's an image-editing miracle—layers without the pain.

revamped transformation model. Hopefully, this article will help you bypass my week of cursing and flow seamlessly into the waters of joyful productivity. Of course, if you still feel the urge to deliver a few choice words in Photoshop's direction despite my helpful advice, then go right ahead. I've never met a program that didn't deserve an occasional earful.

Taking a Cue from Live Picture

Rumor has it Adobe came very close to numbering this upgrade 3.5. And if it weren't for the liberal interface and shortcut modifications, I think it would have deserved that label. This is clearly a modest upgrade of features—beefier than the transition from Photoshop 2.0 to 2.5, but skimpier than that from 2.5 to 3.0. The native Photoshop file format is intact; it still lacks the hierarchical "pyramid" structure that helps accelerate operations in Live Picture and Macromedia xRes. The type tool remains unchanged; there is no new support for spot color; and possibly most disappointing, you are still limited to a single level of undo.

Adjustment Layers What we have instead is a collection of evolutionary enhancements that won't rock your world, but will improve your ability to work inside the program. Taking a cue from Live Picture, Photoshop offers so-called adjustment layers, which are color-corrective overlays that affect all layers below them (see the sidebar "Color Correction Made Easy"). They permit you not only to correct multiple layers at a time, but also to apply flexible corrections that you can later modify or mask.

An adjustment layer takes up very little room in memory—no more than a mask, and frequently much less—and you have only to double-click on the layer to examine or modify the last settings you applied. To adjust the area affected by the color correction, simply paint inside the layer to edit the correction's mask. As I've said many times about similar functions in Live Picture, Photoshop's adjustment layers hardly eliminate the need for true multiple-level undos. But they do make it easier to address mistakes.

No Filters Allowed My one complaint about adjustment layers is that they don't accommodate filters. This means you can't create a layer that sharpens all layers below it, as you can in Live Picture. For the present, adjustment layers accommodate only those operations that compare a single pixel on one layer with the same pixel on another. Because filters like Unsharp Mask and Gaussian Blur compare neighboring pixels on a single layer, they don't fit into Photoshop's approach to working on pixels across layers. Even so, I see no reason why Adobe can't provide a filter layer that affects one image layer at a time. This would give you the flexibility to edit the filter later down the line, which is after all the primary advantage of adjustment layers.

Still, artists are already making creative use of this feature. As I learned from New York–based Photoshop artist Eric Reinfeld, you can use adjustment layers to apply quick and efficient calculations. In the past, you could duplicate a scanned image to a new layer and apply a blend mode such as Screen to uniformly brighten the colors. Now you can do the same thing by applying Screen to an empty adjustment layer (see the image "Effortless Calculations"). The old way doubles the size of the image in RAM, while the new way requires almost no additional data. You won't see this technique pop up on a features list, but it's likely to have a dramatic effect on the way professionals use the program.

The Expanded Role of Layers

Photoshop 4 introduces a new caching scheme that Adobe claims should have a dramatic effect on the speed of the final version, particularly when you're working with multilayer compositions. You have control over the number of caching levels, each of which translates to a resampled copy of the image in RAM. The default four levels of cache hold four downsamples—at 1:2, 1:4, 1:8, and 1:16 zoom ratios—helping to accelerate some functions at smaller view sizes. Caching can't match the time savings afforded by a pyramid file format, such as Live Picture's IVUE, but it also doesn't incur larger files on disk.

The Death of Floating Selections In an effort to encourage you to use layers—and thereby take better advantage of caching—Photoshop 4 has all but eliminated floating selections, which once served as temporary layers you could quickly position, edit, and merge with stationary pixels. Just about every operation that used to automatically produce a floating selection—from creating a few words of text to pasting an image from the Clipboard—now results in a new layer

(see the image "Writing on the Layer"). And operations that used to be friendly to floaters, including filters and color corrections, now flatten them. For example, if you so much as invert the colors in a floating selection, Photoshop drops the floater into place, effectively adhering your modification to the underlying original. About the only thing you can safely do with a floater is move it and fill it with a color or gradation.

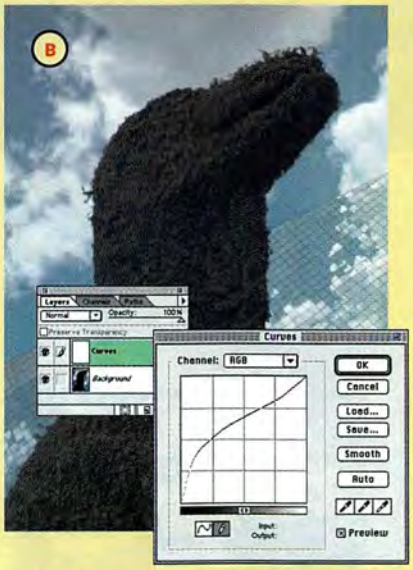
This small change has a huge ripple effect within the new Photoshop. Old floating shortcuts now produce layers. And new commands—such as Fade Filter, which diminishes the effect of the last filter or color correction you applied—have sprung up to atone for the lack of floaters.

You Will Use the Move Tool Version 4 also forces you to use the primary layering instrument—the move tool—for all

Color Correction Made Easy

Possibly the most important addition to Photoshop 4 is the adjustment layer, which permits you to apply a color correction as an independent layer. Unlike standard color corrections, an adjustment layer affects all layers beneath it, and you can edit the adjustment long after applying it.







A

Although many artists will use this new feature to edit multilayer compositions, adjustment layers are equally applicable to flat photos. The following steps explain how I corrected an image shot with a Polaroid PDC-2000 using a total of three color corrections, layered one on top of the other.

At first glance, the original photo is a textbook example of what happens if you ignore backlighting. But as any Photoshop user knows, an image that appears black may actually contain several thousand colors just itching to get out.

B

Adjustment layers make this easier than ever. You create an adjustment layer by ⌘-clicking on the little page icon at the bottom of the Layers palette. Photoshop asks you which of several color correction-commands you want to apply.

Because my image was in such rotten shape, I decided to start with the expert Curves command, which permits you to graph colors precisely to new brightness values. I used Curve's pencil tool to draw a radical upswing on the right side of the graph, dramatically lightening the blacks right out of the gate. Then I clicked on the Smooth button a few times to even out the color transitions.

All this lightening resulted in some very washed-out colors (a typical side effect), so I created a second adjustment layer using Photoshop's Hue/Saturation command. By raising the Saturation value, I quickly breathed a little enthusiasm into these tired old hues—a sufficient amount, in fact, to make it clear how soft the focus was. So I went back to the original image layer and applied the Unsharp Mask filter (Photoshop's primary sharpening function).

Had it not been for Photoshop 4's adjustment layers, I would have either had to sharpen the image before color-correcting it, making it impossible to gauge the results accurately, or to sharpen the image after correcting, which might have brought out compression artifacts and other undesirable anomalies. But with adjustment layers, I can sharpen and correct at the same time, giving no operation precedence over the other.

The hedge monster remained a little dark, so I selected it with the Color Range command—which automates the selection of color ranges—and then created a third adjustment layer for the Levels command. Using Levels, I quickly enhanced the brightness and contrast of the green beast, bringing him out into the full light of day.

C

Photoshop automatically generated a layer mask for my selection, which appears as a tiny white silhouette in the Layers palette (see inset). The best news is, none of the color corrections I've applied are set in stone. I can tweak any adjustment layer by double-clicking on its name in the Layers palette and revise the settings until I'm a bright sky blue in the face.

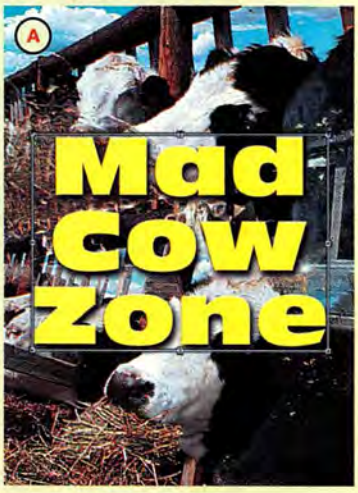
moving and cloning operations. No longer can you move a selection by dragging it with the marquee, lasso, or wand; you have to press the ⌘ key to temporarily access the move tool, and then drag. This means ⌘ is no longer available for subtracting from a selection, so this and many other long-standing techniques fall to the option key (see the table, "Maximizing Productivity in Photoshop 4").

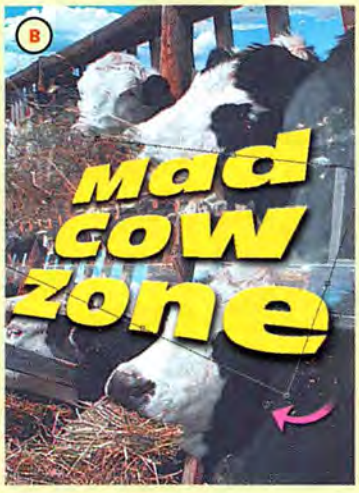
Bewildering as all this sounds, it's hard to come up with any objective reason why the new push toward layers isn't entirely for the better. Layers offer all sorts of masking options that floaters lack, you can't muck them up as easily as floaters, and every layer-inspired modification in Photoshop 4 produces at least one significant benefit. For example, now that the selection tools have been relegated exclusively to modifying selection out-

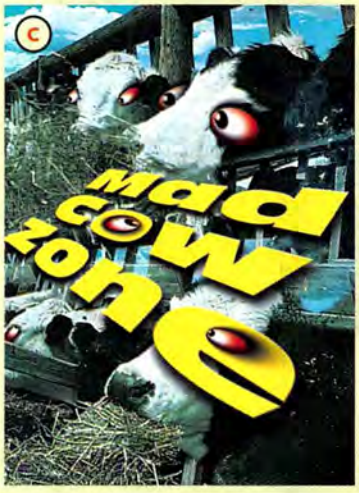
One-Stop Transformation Headquarters

The Free Transform command is one of my favorite new toys in Photoshop 4. It lets you experiment with every one of Photoshop's transformations without doing any permanent damage to the affected layer. You can even move the layer while transforming it to compare it with other image elements. And if that's not enough, you can clone with the Free Transform command, and transform multiple layers simultaneously.

After capturing various local bovines with my trusty digital camera, I scurried back to the office and assembled a random composition of some of the ladies at their feed. Then I created a few lines of type, which Photoshop automatically introduced as a new layer. I added a second layer behind the type to hold the black drop shadows. After linking the type and shadows inside the Layers palette—by clicking in front of the name of the layer that was not active—I was ready to begin transforming the two layers as one.







(A)

Pressing ⌘-T (the shortcut for Free Transform) displayed a marquee with eight handles. Even though neither the text nor the shadow layer was active, Photoshop automatically tightened the marquee around the letters. At this point, I had these options.

- Drag any of the handles to scale the layers. I could also shift-drag to scale them proportionally.
- Drag inside the marquee to move the layers.
- Drag outside the marquee to rotate the layers. Incidentally, these three techniques also work whenever you are resizing an image with the crop tool.
- To skew the layers, ⌘-drag one of the side handles.
- Or ⌘-drag a corner handle to distort the layers.
- Finally, ⌘-option-drag a handle to distort opposite corners in opposite directions. (Or, given the questionable taste of using mad cows, I could stop right here.)

(B)

I chose to ⌘-drag each of the four corner handles to achieve a perspective effect. Then I dragged outside the marquee to rotate the letters a bit clockwise. Then I dragged and ⌘-dragged some more until I got precisely the effect I wanted. (It looked good at the time, anyway.) Throughout all this dragging, redragging, and generally changing my mind, I hadn't altered so much as a single pixel in either the type or the shadow layer. In fact, I could have bagged the entire transformation easily by pressing the escape key.

(C)

However, I liked what I saw, so I pressed return to apply the effect. Then and only then, Photoshop gathered up the math and applied it all at once to the pixels in the layers. At about the same time, it occurred to me that my cows didn't looked particularly mad, so I gave them wacky eyes. In keeping with my transformation theme, I painted just one eye and duplicated it over and over again to create the other ones. To transform and clone, you press ⌘-option-T.

It's a lot to remember, particularly since ⌘-T and ⌘-option-T produced entirely different results in Photoshop 3. But once you get the hang of it, Free Transform is an amazingly useful feature.

And if you know exactly how much you want to transform a layer, press ⌘-shift-T to access a dialog box full of numerical transformation controls.

lines, you can drag and drop an outline (sans pixels) from one image window to another, something you couldn't do in Photoshop 3.

Adobe has applied its changes carefully and deliberately—if autocratically—and you'll probably be glad for them once you become fully accustomed to the upgrade. But I have to say, after two months of Photoshop 4, I still miss the convenience of floaters. And the day I want a piece of software to tell me how I should work, I'll have myself replaced with a robot.

Transformations, Scripting, and More

Whatever your take on the layers-in-your-face debate, I imagine most of Photoshop 4's other enhancements will inspire squeals of glee.

Top Transformations Transformations are one area in which the updated image editor has pretty well nailed it. Not only can you apply numerical transformations to any selection or layer (a first in Photoshop), but with the Free Transform command you can apply all varieties of transformation—scale, rotate, skew, distort, and move—in a single discrete operation (see the sidebar "One-Stop Transformation Headquarters").

So rather than resizing, spinning, and slanting an image in three separate steps—forcing Photoshop to interpolate three generations of pixels, each one slightly less accurate than its predecessor—you can apply all transformations in one fell swoop, subject to a single recalculation. You can even link multiple layers and transform them all at once.

Whether you're trying to merely straighten a scan or to insert a complex image into an intricate composition, Free Transform is superb. In fact, all that stands between Photoshop 4 and absolute transformation perfection is an eight-point enveloping feature.

Recording Your Actions The new Actions palette supplies scripting and batch processing, two very important features for professionals and service-bureau technicians. Though incompatible with AppleScript, the new scripting feature is extremely easy to use and quite flexible. You can instruct a script to apply predefined numerical values or present you with a dialog box. You can drag operations up and down inside a list to change their order, and even duplicate actions from one script to another by option-dragging. The batch-processing feature accommodates folders of files on your hard disk as well as images imported from a digital camera.

There is one fly in the scripting ointment, however. While the Actions palette replaces the old Commands palette—which allowed you to assign function keys to often-used commands—you can't open Commands palette settings in Photoshop 4. This means you either have to re-create your settings from scratch or simply change your ways.

Also, you're still limited to using function keys to invoke your scripts. (Adobe maintains that permitting you and me to assign any old key combo would pose problems for its technical-support department. How does Microsoft manage?) So if you want to apply something logical, like ⌘-option-I to the Image Size command, you have to use CE Software's QuicKeys or some similar utility, just as in the old days.

Gradients, Grids, and Guides Like its object-oriented cousin Adobe Illustrator, Photoshop 4 lets you create custom gradations with as many as 32 colors. You can adjust midpoint settings, name a gradation for later use, and assign targeted opacity settings, à la MetaTools' Kai's Power Tools. (Kai's Gradient Designer is still more capable, but Photoshop's gradient editor gets you in and out more quickly.) Combined with blend modes, the new gradient feature becomes a powerful special-effects tool, great for adding a rainbow of colors to a drab image (see the image "Color on the Tracks").

This is also the first version of Photoshop to offer snap-to grids and guides, useful for aligning text and other layered elements. (It's hard to believe Photoshop got grids before Illustrator.) The new Navigator palette provides a constant thumbnail view of your artwork, permitting you to zoom and scroll inside large images more easily. And just to make life easier, you can zoom with 0.01 percent accuracy, enter custom numerical zoom ratios, and quickly switch to the 100 percent view from the keyboard.

The Last Word

Photoshop 4 doesn't provide the dramatic speed improvements that many prepress professionals have been clamoring for. And it includes a wealth of low-level modifications I've never heard anyone



Writing on the Layer Though Photoshop 4's penchant for placing type on a new layer may be confusing at first, you can quickly put it to good use. After creating the above text, I added a layer of pool water and combined text and water into a clipping group, which masked the water so that it precisely colored the type. I also exploited the type's Inherent Transparency mask to create the highlights and drop shadows that give my letters depth.



Color on the Tracks Photoshop's new gradient tool lets you assign up to 32 colors and as many opacity levels per fill. In the left image, I applied a 7-color linear gradation using the Color blend mode. In the right image, I added a different 7-color radial gradation with the Overlay mode. This second gradation also includes a total of 14 opacity settings, permitting the fill to fade in and out between each color.

Maximizing Productivity in Photoshop 4

There's nothing worse than going to the trouble of learning a keyboard equivalent or modifier-key technique, and then watching it change on you. One moment you're whizzing through the program at light speed, the next you're sputtering as if you've run out of gas. To help keep your sputtering to a minimum, this table lists 30 key operations that Adobe has changed or added in Photoshop 4. If an item in the middle column includes an asterisk (*), then the shortcut still produces the same effect as it did in Photoshop 3—the new way is merely an alternative. Otherwise, the old shortcut either produces a different effect or no effect at all.

Operation	Old Photoshop 3 Shortcut	New Photoshop 4 Shortcut
Ascend or descend one layer	⌘-] or ⌘-[	option-] or option-[
Automatically fix color levels	none	⌘-shift-L
Change the Opacity setting for brush or layer in 1% increments	none	press two number keys in a row
Clone selected area	option-drag area with selection tool	⌘-option-drag with any tool
Clone selection to new layer	none	⌘-J
Convert layer's transparency mask to selection outline	⌘-option-T	⌘-click on layer name in palette
Copy merged version of selection	none	⌘-shift-C
Cycle through path tools	none	press the P key
Cycle through rubber stamp options	none	press the S key
Drop floating selection	⌘-J	⌘-E
Fade last filter or color correction	none	⌘-shift-F
Fill selection with background color	delete (only on background layer)*	⌘-delete (on any layer)
Float selection in place	⌘-J	⌘-option–up arrow, then down arrow
Go directly to layer that contains specific image	⌘-click on image with move tool	⌘-option-control-click on image with any tool
Hide all palettes except toolbox	none	shift-tab
Invert selection	none	⌘-shift-I
Merge all visible layers	none	⌘-shift-E
Move marquee while drawing it	none	press the spacebar
Move selected area	drag area with selection tool	⌘-drag area with any tool
Move selection outline independently of image	⌘-option-drag area with selection tool	drag area with selection tool
Numerically transform a selection	none	⌘-shift-T
Rotate cropping marquee	option-drag handle	drag outside marquee
Save a copy of layered image	none	⌘-option-S
Select pencil tool	press the P key	press the Y key
Select type tool	press the Y key	press the T key
Subtract from selection outline	⌘-drag with selection tool	option-drag with selection tool
Switch focus from image to layer mask	⌘-tilde (~)	⌘-backslash (\)
Switch to color composite view	⌘-0	⌘-tilde (~)
Zoom image to custom ratio	⌘-spacebar-click in image*	⌘-drag inside Navigator palette
Zoom in without changing window size	⌘-spacebar-click in image*	⌘-option-plus

express interest in. Nonetheless, I must say that I've come to admire this upgrade a good deal more than I anticipated when I first started using it.

While there's no single knockout feature that expands your creative range by a quantum leap—the way layers did in Photoshop 3, for example—version 4 proves itself a stalwart upgrade. The adjustment layers are terrific, the transformations are invaluable, and the other modifications are implemented quite well. Throw in support for new Web formats such as Progressive JPEG, PNG, and Acrobat PDF; better previews for distortion filters; a type-mask tool that selects character-shaped areas; improved layer masking; a watermarking feature for appending indelible copyright notices; and keyboard shortcuts for reordering layers; and you have a lot of little parts that add up to a big whole.

For experienced users, the downside is the rearranged interface. Adobe claims that the changes make version 4 more approachable for new users. While I think it's unlikely most new users will notice the difference, I will admit version 4 is ultimately more logical and more streamlined than its predecessor, which is saying quite a bit. But it comes at a cost. If you're prepared to suffer through a few days of reduced productivity, then rest assured that Photoshop 4 will reward your patience with increased flexibility and more precise pixel-level control. m

IMAGE-EDITING SOFTWARE

★★★★/8.3 **Photoshop 4.0** The new adjustment layers, pixel-transformation features, type-mask tool, and added support for Web files are the reasons to get Photoshop 4.0. The revamped shortcuts will confuse experienced users, but that's a worthwhile effort for most people. **Company:** Adobe Systems (415/961-4400, *http://www.adobe.com*). **List price:** $895.

Contributing editor DEKE McCLELLAND is the author of the newly released *Macworld Photoshop 4 Bible* (IDG Books Worldwide, 1997), the best-selling guide to Photoshop translated into ten languages. Visit his Web site at *http://www.dekemc.com*.



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Top to bottom: Apple Color StyleWriter 2500, Epson Stylus Color 500, Hewlett-Packard DeskJet 870Cse.

Color Ink-Jet Jewels

MW LAB

GORGEOUS OUTPUT AT ROCK-BOTTOM PRICES

BY SUZANNE COURTEAU

WHAT A GREAT TIME TO BE A COMPUTER user: Macs continue to climb in power while dropping in price, color monitors are de rigueur, and inexpensive color scanners and digital cameras abound.

And when it comes to printing those color images, there's more good news: the quality of ink-jet color printers continues to improve while prices keep coming down—some models now cost as little as $200.

Macworld Lab evaluated eight color ink-jet printers for both home and corporate users, to see how well they performed in a variety of printing tests. (We also looked at the Alps Electric MD-2010 [*http://www.alpsusa.com*]. While it's not a color ink-jet—the printer uses a ribbon cartridge somewhat like the cartridges on typewriters—it serves the same kinds of needs.) We then took our piles of output samples and ran them by a panel of experts to determine which printers produced the sharpest text and richest colors. We also time-tested the printers and ranked them according to output speed. And we took into consideration ease of use, software, and other factors.

From our tests, we found that economy ink-jet printers still don't challenge color laser printers for speed, or dye-sublimation printers for photographic-quality prints. But as a rule, ink-jets produce respectable color output—good enough, at least, for memos, letters, reports, printed presentations and slides, and even a few vacation snapshots.

Prints Charming

To judge their output quality, we gave each printer three types of files to print: a ClarisWorks newsletter that combined mostly text with line art

KEVIN CANDLAND

and a small color graphic; an Adobe Photoshop file; and an Adobe Illustrator document. We wanted to see how each printer overcame the typical ink-jet shortcoming of fuzzy text (this happens because the ink from ink-jet printers is absorbed into paper). We also wanted to see how well each printer did with fine line detail, smooth color blends, and color saturation (our Illustrator test), as well as shadow and highlight detail (our Photoshop test).

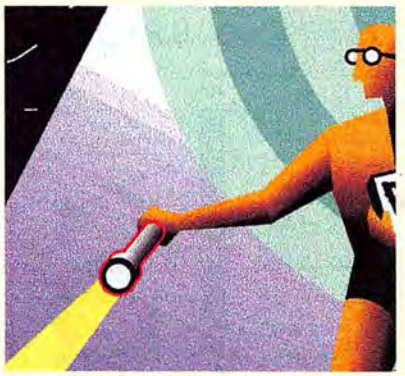
We printed each sample on both plain laser-printer paper and glossy paper. As a rule, glossy paper gives better results (less ink absorption to blur lines), but it's about 14 times more expensive.

In terms of quality, Hewlett-Packard (*http://www.hp.com*) ink-jet printers swept the ClarisWorks text output test on plain paper (see the benchmark "Who Wins for Quality"). Six printers scored acceptably well with the ClarisWorks file on glossy paper (not shown in the benchmarks), though the HP DeskJet 870Cse was the only one to get high marks for plain-paper and glossy output in this test. If quality text output is an important consideration for you, the 870Cse is the printer of choice. Curiously, however, its glossy-paper output in the Photoshop and Illustrator tests turned out too dark and saturated (see the output samples, "Results Not Quite Picture-Perfect").

The Epson America (*http://www.epson.com*) Stylus Color 500's plain-paper and glossy output of the Photoshop and Illustrator files got raves for color fidelity, contrast, and detail. You'll have to wait several minutes for that gorgeous output, but if you plan on using the Epson primarily for presentations or photos, the wait is worth it.

The BJC-4550, from Canon (*http://*

Results Not Quite Picture-Perfect



Epson Stylus Color 500



Epson Stylus Color 500



Canon BJC-4550 with Photo Inks



Apple Color StyleWriter 1500



HP DeskJet 870Cse



Apple Color StyleWriter 2500, no Photo Inks

Plain Paper, Plain Output
When using plain paper, lower your expectations. Notice the banding and the abrupt drop-off from purple to white on both prints. The Epson Stylus Color 500's output is brighter and less grainy than that of the Apple Color StyleWriter 1500. And the Stylus Color 500 uses black ink, while the Color StyleWriter 1500 uses cyan, magenta, and yellow to produce a composite—and muddier—black.

Great Glossy Output
On glossy stock, the HP DeskJet 870Cse's colors are certainly vivid, but the overall image has a heavy, dark tone that drowns out details such as the white lines at the top of the image. The Epson Stylus Color 500, while not perfect, gave a more pleasing overall print with less banding and fewer print oddities (such as those seen in the DeskJet's green target).

Better Inks Mean Better Prints
The Apple Color StyleWriter 2500 and Canon BJC-4550 use the same Canon engine. We compared the Canon's output, using Canon's optional $50 Photo Ink Kit, with the StyleWriter's output, with normal ink. The kit gave us a brighter, crisper print with fewer grainy areas. Apple's optional PhotoGrade Ink Kit ($59 to $64, estimated street price) should produce similar results with Apple's printer.

www.ccsi.canon.com), which comes with a photographic ink kit for enhanced photo rendering, generated top-quality photo images on glossy paper, too. Apple Computer (*http://www.apple.com*) has announced an ink kit for its Color StyleWriter 2500 ink-jet (the kit should be shipping by the time you read this). Since the Apple and Canon printers are based on the same engine, the kit should deliver equally fine photographic output on the 2500.

Speed Bumps

When you buy an ink-jet printer, you'd better not be looking for lightning speed. While none of these machines are speed demons, Hewlett-Packard's 870Cse came out on top overall in our speed tests, followed by the Epson Stylus Color 500 and the HP DeskJet 1600CM printers.

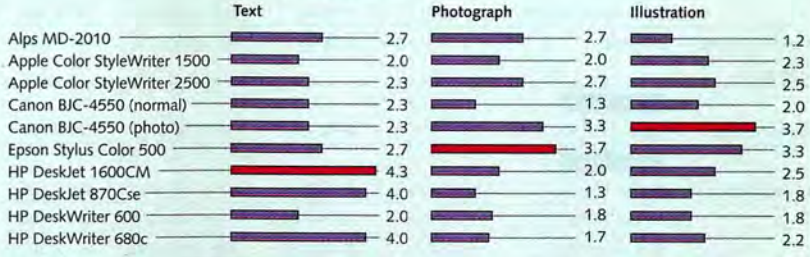
The notable straggler in our tests was the Alps MD-2010. Unlike all the other printers we tested, the MD-2010 connects to the Mac via the SCSI port. We hoped this would give us a speed boost, but the MD-2010 had the slowest overall print speeds in normal mode. That poor showing is due to the fact that the MD-2010 essentially prints each page four times: once each for black, yellow, blue, and red ink.

MW LAB

Who Wins for Quality

Quality is in the eye of the beholder, so a panel of *Macworld* editors and technical analysts rated printouts made at each printer's highest-quality setting, looking for smooth color transitions; rich color; detail in shadows and highlights; and crisp, sharp images and text. We used glossy paper for image samples, plain paper for text.

Best result in test. Longer bars are better. Products are listed alphabetically by company name.



Behind Our Tests

We scored each output sample—text, photo, and illustration—on a scale from 0 (worst) to 5 (best). Neither the testing supervisors nor the judging panel knew which printer produced which prints.—**Macworld Lab testing supervised by Jeff Sacilotto**

The Out-of-Box Experience

I've got one big gripe with all the printers we tested: not one was ready to go out of the box. I'll wait as you reread that line in disbelief. It's true; none of the printers shipped with the necessary serial cable (or in the case of the Alps printer, the SCSI cable). I'd much rather forgo the paper sampler packages and marginally useful—or useless—software bundles that some printers offer, and get the necessary $10 cable instead.

Speaking of software, the applications and utilities bundled with each printer vary widely. The Canon BJC-4550 ships with a Windows-only CD-ROM—thanks

MW LAB

Slow, Steady Color: High Quality Slows Output Speed

On plain paper, output at the highest-quality settings was rarely distinguishable from that printed at normal settings—yet the highest-quality settings' print jobs took much longer to print. On glossy paper, however, the output more clearly reflected quality settings.

Best result in test. All times are in seconds. Shorter bars are better. Products are listed in order of overall performance.

Printer	Quality Mode	INDEX	Illustration	Bitmap Photograph	Long Single-Font Report	Short Multi-Font Memo	Newsletter QuarkXPress	Newsletter ClarisWorks	Web Browser
HP DeskJet 870Cse	Normal	1.00	164	188	127	49	161	100	149
Epson Stylus Color 500	Normal	0.80	191	212	240	60	324	86	175
Apple Color StyleWriter 2500	Normal	0.78	236	216	213	54	215	103	215
HP DeskJet 1600CM	Normal	0.73	196	616	101	91	383	112	150
HP DeskWriter 600	Normal	0.63	230	203	769	108	321	130	187
Canon BJC-4550	Normal	0.61	296	329	249	61	310	125	280
HP DeskWriter 680c	Normal	0.53	349	293	236	82	501	165	286
Apple Color StyleWriter 1500	Normal	0.47	280	284	1201	118	367	215	276
HP DeskJet 870Cse	Best	0.36	471	465	182	174	640	342	508
Alps MD-2010	Normal	0.34	404	363	745	249	510	222	495
HP DeskWriter 600	Best	0.32	444	386	1851	196	515	314	409
HP DeskJet 1600CM	Best	0.30	357	778	1108	205	653	274	379
Apple Color StyleWriter 2500	Best	0.28	591	559	278	202	787	443	619
Alps MD-2010	Best	0.27	530	495	1057	276	657	272	599
Apple Color StyleWriter 1500	Best	0.25	512	491	2546	221	712	429	536
HP DeskWriter 680c	Best	0.24	780	732	766	171	745	301	755
Canon BJC-4550	Best	0.21	671	631	1892	226	918	470	714
Epson Stylus Color 500	Best	0.19	685	720	2796	267	933	534	717

Behind Our Tests

Macworld Lab tested speed using a series of test files typical of jobs for ink-jet printers, including an Adobe Illustrator–generated graphic; a full-color photograph scanned in Adobe Photoshop; a 10-page Microsoft Word document using 1 font; a 2-page Word file with multiple fonts, sizes, and styles; a QuarkXPress newsletter with multiple fonts, and PICT and EPS graphics; a similar ClarisWorks newsletter; and a Netscape Navigator Web page. All tests were performed on a Power Macintosh 7500/100 running System 7.5.5, with 32MB of RAM, a 256K cache, and a 17-inch Apple monitor set to 256 colors, with disk cache set to 1024K, virtual memory and RAM disk disabled, and AppleTalk and Adobe Type Manager 3.9 enabled.
—**Macworld Lab testing supervised by Jeff Sacilotto**

A Clear View of Color Ink-Jets

Company	Product	Star Rating[A]	List Price/ Estimated Price[B]	Phone	B & W Resolution (in dpi)	Color Resolution (in dpi)	Comments
Alps Electric	MD-2010	★★★/5.4	NP/$499	408/432-6000	1200 × 600	600 × 600	Poor output quality; slow print speeds.
Apple Computer	Color StyleWriter 1500	★★★/6.9	NP/$349	408/996-1010	360 × 360	720 × 360	Lackluster performance and image quality.
	Color StyleWriter 2500	★★★★/7.5	NP/$249	408/996-1010	720 × 360	720 × 360	Relatively fast; fair image quality.
Canon Computer Systems	BJC-4550	★★★★/7.3	NP/$499	714/438-3000	720 × 360	720 × 360	Beautiful images using optional photo ink kit.
	Editors' Choice						
Epson America	Stylus Color 500	★★★★/7.8	NP/$279	310/782-0770	720 × 360[C]	720 × 360[C]	Good price, output, and speed, but messy.
	Editors' Choice						
Hewlett-Packard	DeskJet 870Cse	★★★★/7.8	$599/$499	408/246-4300	600 × 600	600 × 300	Faster than all; great text, fairly good images.
	DeskJet 1600CM	★★★/6.9	$2479/$1999	408/246-4300	600 × 600	300 × 300	Good speed and crisp text; expensive.
	DeskWriter 600	★★★/5.9	$249/$199	408/246-4300	600 × 300[D]	300 × 300[E]	Nice price; decent speed; average print quality.
	DeskWriter 680c	★★★★/7.2	$357/$279	408/246-4300	600 × 300[D]	300 × 300[F]	Above-average image quality.

NP = Not provided. [A] Based on features, implementation, innovation, performance, reliability, ease of use, and value. (See Star Ratings section for full explanation.) [B] Actual price could be higher or lower than the estimated street price provided by the company. [C] On premium paper resolution increases to 720 × 720. [D] In normal mode; best mode resolution is 600 × 600; draft mode resolution is 300 × 300. [E] On plain and HP premium paper; on HP glossy or transparency paper resolution is 600 × 300. [F] On plain paper; 300 × 600 on HP premium paper.

a lot! Meanwhile, Epson goes whole hog and includes Adobe PhotoDeluxe and Adobe HomePublisher, free fonts and images, coupons for Epson scanners and inks, even a deal on Hanes T-shirts. Whew.

Technical Difficulties, Please Stand By

Even a toaster acts up occasionally; ink-jet printers are no different. We inadvertently corrupted the BJC-4550 driver when we tried to print with Canon's optional photo ink kit without changing the setting in the Print dialog box, for instance.

The Alps MD-2010's ink cartridges are waterproof and lightfast. The downside is the frustration of trying to figure out which cartridge goes where. Cartridges and their corresponding holders are labeled 1 through 4—most of the time (some of the cartridges we received were labeled 0 through 3).

The Epson Stylus Color 500's print head smashed against the side of the printer on occasion. Sometimes canceling the print job was enough for the printer to recover. Other times, the sound of the print head's banging was so alarming we turned off the printer in the middle of the job. The manual says you should never do that, but when you hear your printer self-destructing, what choice do you have?

The Epson printer also occasionally stopped to clean its print head *during* a job—an operation that took about 10 seconds. But considering that the Stylus Color 500's print head clogged more frequently than those in any of the other printers we tested, that's not such a bad thing.

The HP DeskWriter 680c waited until the end of a print job to clean the print head, which also took about 10 seconds. But that meant waiting for the printer to get to ready status before printing the next item—a time increase that our time tests don't reflect. The DeskWriter 680c was the most trouble-free of all the printers we tested, however.

The Last Word

The DeskJet 870Cse was the fastest printer we tested, and it landed near the top of our charts for text quality. It also tied with the Stylus Color 500 in our plain-paper Photoshop test. With its extra-large ink tanks and its Mac and PC compatibility, this printer is well suited to the corporate or home-office user who needs an ink-jet primarily for text-heavy jobs such as letters, newsletters, and the like, with occasional graphics or spot color.

The Epson Stylus Color 500 was the second-fastest overall in terms of speed, though it also managed to be the slowest printer in our best-mode tests. It's an average performer with text, but the Stylus Color 500 is about graphics anyway. And the Stylus Color 500 consistently rated high in our quality tests on both plain and glossy paper. It was the messiest printer we saw, though, sometimes dribbling ink on the leading edge of our prints. If you use it in a less-demanding home situation, where you aren't typically cranking out prints like we did, this messiness should be more than offset by the rich color and quality, as well as the software bundle—and all for only $279. **m**

SUZANNE COURTEAU, better known as "—Ed." in *Macworld*'s *Letters* pages, happily prints in full, glorious color at her home office.

COLOR INK-JET PRINTERS

MW EDITORS' CHOICE We looked for reasonable print speed as well as outstanding print quality—including crisp text and rich color graphics.

Office Printer

★★★★/7.8 **DeskJet 870Cse** The fastest speed around and unbeatable text printing, plus cross-platform compatibility, make this an outstanding choice for inexpensive office printing. **Company:** Hewlett-Packard, 800/752-0900, *http://www.hp.com*. **Company's estimated price:** $499.

Home Printer

★★★★/7.8 **Color Stylus 500** Beautiful graphics with reasonable speed and an incredible price make this a great printer for home users. **Company:** Epson America, 310/782-0770, *http://www.epson.com*. **Company's estimated price:** $279.

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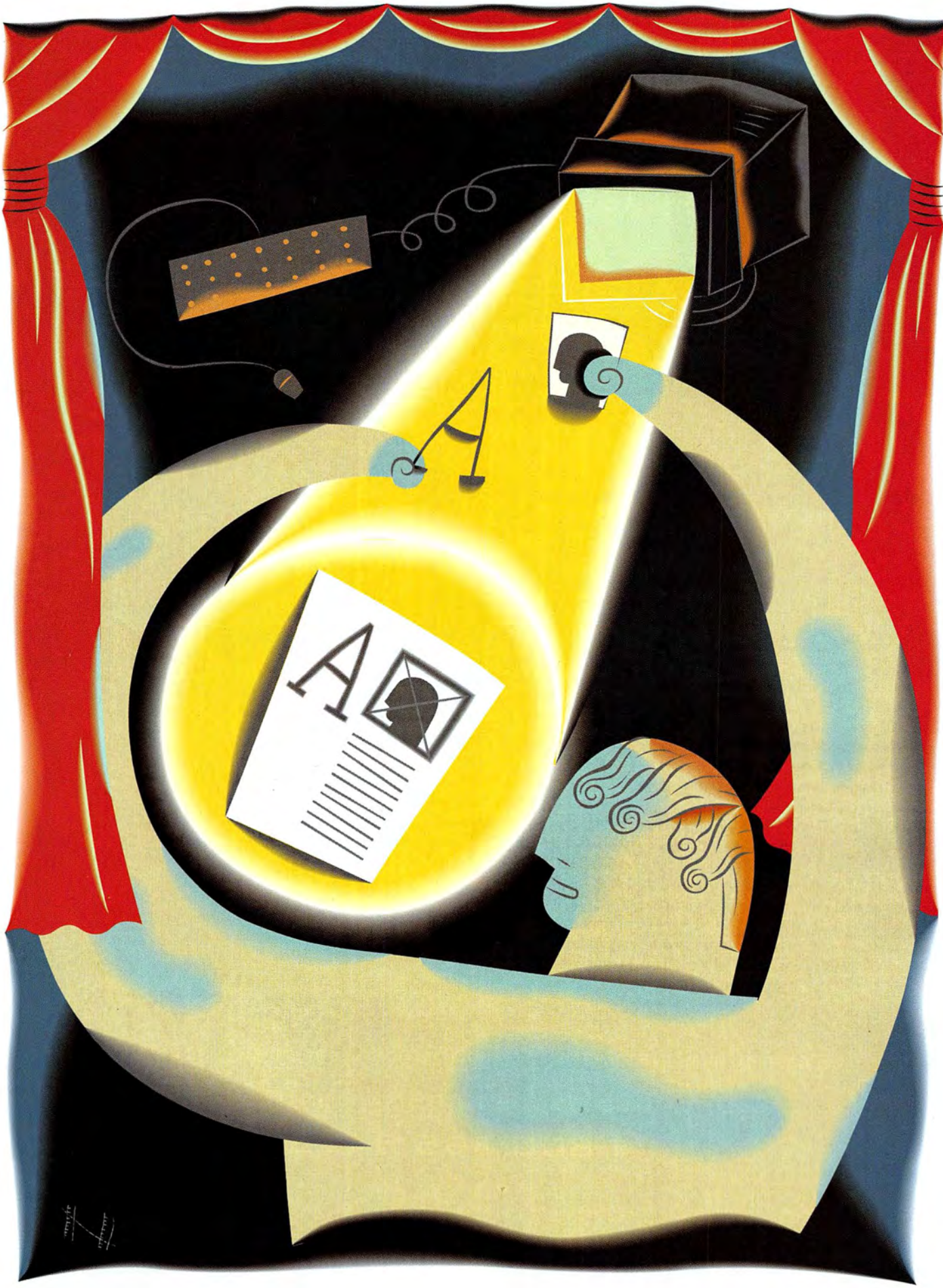
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Overhauled interface spotlights hidden strengths for Web and print designers

PageMaker Revamped

by Galen Gruman

BOTH OLD AND NEW AGAIN—that's the new PageMaker. Version 6.5 adds a range of useful new features, but the best addition to this venerable desktop publisher is a revamped interface that makes it truly easier to use. As programs like PageMaker pass the decade mark, it gets harder and harder for developers to add new features, so refinements are the order of the day. That's exactly what Adobe Systems (415/961-4400, *http://www.adobe.com*) is up to in its second upgrade to PageMaker since it acquired the program a little over two years ago from Aldus. (PageMaker is not alone in Adobe's interface/usability campaign. The new versions of Persuasion and Photoshop also reflect the new design; for more on changes in Photoshop, see "Photoshop's New Look," in this issue.)

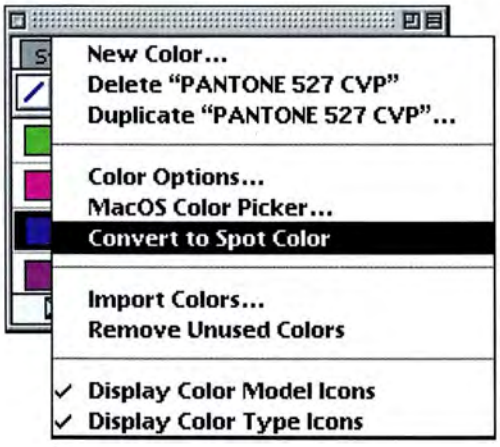
Refinements are as provocative as new features, but in this case, the interface refinements make several existing features easier to use—so much so that you'll probably find yourself using features you forgot, or perhaps never knew, you had. Most notable is the enhanced HTML export tool, which lets you create Web pages from your PageMaker documents. The new, improved plug-in architecture may also result in third-party Web publishing tools to rival those now available for QuarkXPress. The sidebars "From Print to Web" and "Exporting Your Document" show how to use PageMaker 6.5's Web-page creation features.

PageMaker 6.5 is scheduled to ship by early December 1996 at a cost of $895; upgrades from version 6.0 will cost $99. To give you a preview of version 6.5's new features before you upgrade, *Macworld* obtained a late prerelease version to find out what had changed since fall 1995, when version 6.0 came out. In the final version of the program you may notice some slight differences in the icons and dialog boxes from what our prerelease version had, but nothing significant. When that final version ships, *Macworld* will rate it and publish our review. In this article, we help you understand how to use this revision to a major Macintosh program and let you see whether an upgrade is worth considering. This issue inaugurates a new series of articles in *Macworld* that provide in-depth how-to examinations of major programs' new versions.

JEFF NEUMANN



A



B

One-Stop Menus PageMaker has added several shortcuts to its palettes. Note the copy and delete icons at the bottom of the palette, for example (**A**). There's also a new quick-access icon (the triangle at the upper right) that, when clicked on, brings down a palette of options relevant to what is selected (**B**).

Photoshop Meets PageMaker

Adobe is giving its entire product line—most of which it has acquired over the years from other companies—a face-lift so they all work together more seamlessly and so you can take your knowledge of any other Adobe program and apply it here. That means more common interfaces, but it also means sharing technologies across several programs. PageMaker 6.5 continues this trend in both ways, adopting several approaches from Photoshop 3.0, including tabbed palettes and layers.

Adobe is so intent on making the interfaces of its programs look alike that it has added a graphic to the top of each program's Tool palette to *distinguish* the program. That's the funny pattern across the palette's top.

Quick Access The best interface enhancement is the new quick-access feature on the floating palettes. Take a look at the two screen shots labeled "One-Stop Menus." The first is the Colors palette (A). Notice that in addition to the color swatch and name, there are now icons under the Tint box that tell you what kind of color you have—RGB or CMYK (the left-hand icons) and spot or process (the right-hand icons). No more going to the dialog box to find out.

Also notice the pop-up indicator in the palette's upper-right corner next to the sizing box. That's a stroke of genius. Click on it, and you get quick access

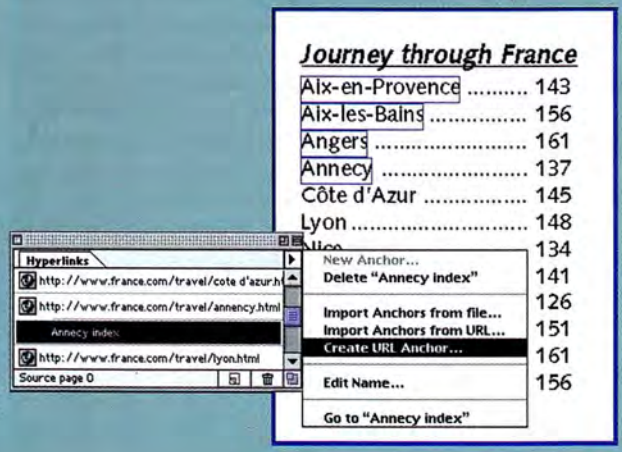
PageMaker 6.5: From Print to Web

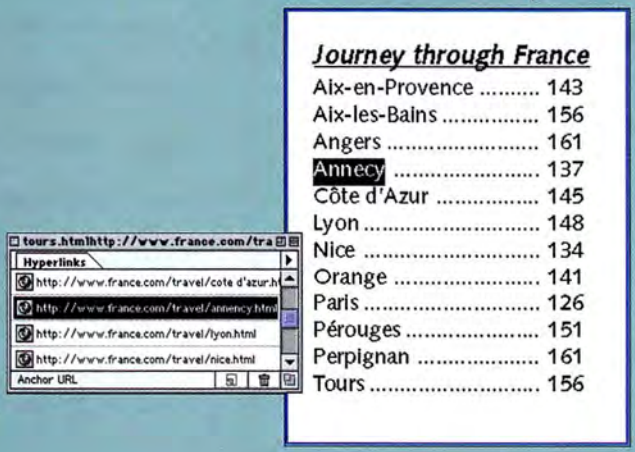
Everyone is trying to help you publish on the Web. There are a score of plug-ins for the publishing leader, QuarkXPress (see "Web Authoring's New Tools," *Macworld*, October 1996), plus Quark's own Immedia plug-in for multimedia and Web authoring (see "Quark Goes Interactive," in this issue). But what about PageMaker users? Adobe has provided its own plug-in for PageMaker users since version 6.0 came out a year ago. And version 6.5 enhances that plug-in even more, as well as integrating Web links throughout the program.

There are two basic components to Web-page creation in PageMaker. One is the integration of Web links (shown here), and the other is the creation of HTML code to represent the page (see the following pages).

Linking to the Web The Hyperlinks palette is the key to creating links, whether to the Web or to other locations in your layout. Here's how it works.

1 Create the Web references, using the Create URL Anchor option in the Hyperlinks palette. I suggest you create as many as you think you will have, and have them all





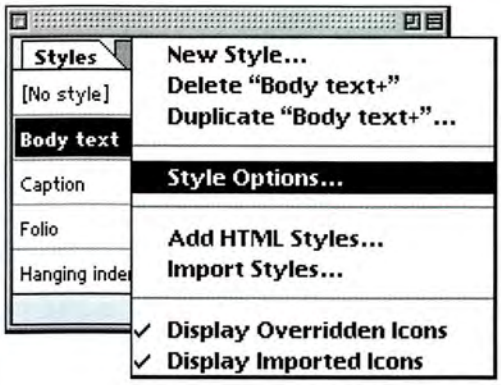
to relevant options for the selected item, as well as to general related features (B). Thus, for colors, you can change the selected color from spot to process, delete or duplicate it, or create a new color—all without using the main menu bar or remembering arcane keyboard shortcuts.

You'll find this quick access in all palettes, which will make your work easier across the board, from managing text styles to hypertext links. The screen shot "Style Variations" shows the quick-access features for the Styles palette.

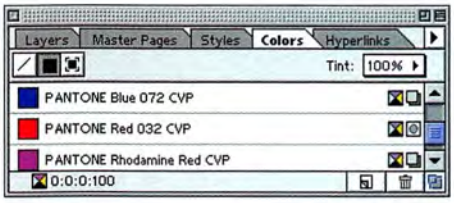
Tabbed Palettes You may have noticed that the Colors palette is tabbed, and that the palette window in "One-Stop Menus" had a tab for the Styles palette as well. Thank Photoshop, the source of this feature. And just as in Photoshop, you can drag palettes from one window to another, letting you organize them as you prefer. You could have all palettes in one window, as in the screen shot "All Together Now," each in its own window, or combined in any other way.

Overlays If you've ever done old-fashioned production work, you'll remember the thin yellow or white tracing paper and plastic sheets used to specify colors and to add knockouts and spot colors. Taking another cue from Photoshop, PageMaker offers an electronic equivalent, called layers, which gets its own palette.

Layers are something you'll use according to



Style Variations As it does for all palettes, PageMaker 6.5's quick-access icon lets you get all relevant options for the Styles palette. Note the options for HTML styles—one of many Web-related enhancements.



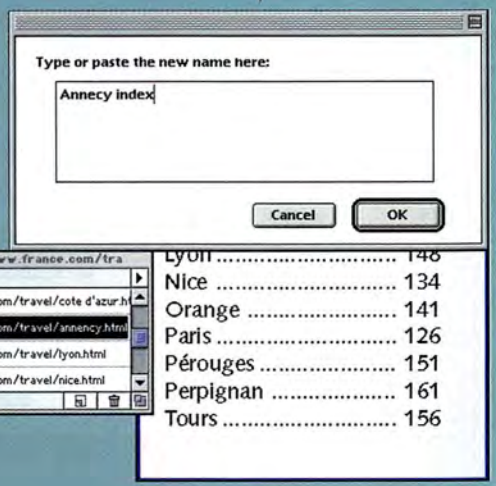
All Together Now The new tabbed panes in PageMaker's floating palettes let you combine or separate them as you prefer. Here, all the panes are in one palette.

ready for linking before you start specifying where the links go. Note that you need only one anchor per Web address, even if you have more than one link to that address.

2 Highlight the text, or select the graphic, from which you want to jump the reader to the Web. In the Hyperlinks palette, select the icon for the desired URL anchor.

3 You'll be asked to give this link a name. This name records the link between the selected text or graphic and the URL anchor. Each link to the URL anchor needs its own name. You'll see the names of links to a particular Web address under the URL anchor in the Hyperlinks palette.

4 When doing a layout, you won't see the links unless you select the grabber tool, in which case all links will be shown with a blue box around them, as in the first image in this series.





your own individual needs. Some people might put all graphics on a separate layer, so they can then turn off the layer and do a quick draft print of just the text. Or they might use a layer to annotate a layout, perhaps leaving notes for the copy editor or another designer. You can have at least 256 layers (Adobe wasn't sure what the final number would be at press time), color-coding each one.

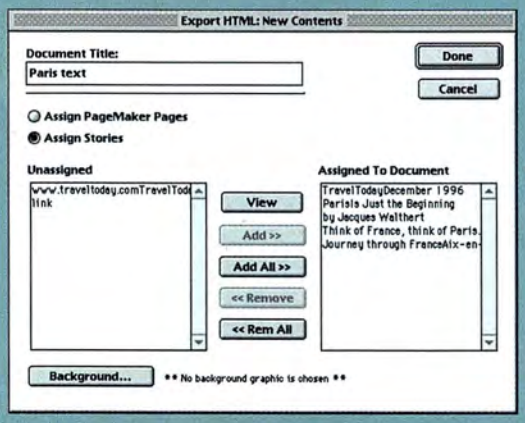
The colors show up in two places. First, the Layers palette will show what layer the current object is on, as the screen shots in "A Layer of Their Own" show. Here, the selected image is on the Images layer (red). In the layout itself, the selection handles (those eight little boxes around an element that you use to size and scale it) will also be red, so you can quickly tell which layer the image is on.

Moving an item from one layer to another is just a bit tricky. After selecting the item, you drag the

PageMaker 6.5: Exporting Your Document

Once you've laid out your document and embedded your links, you're ready to create an HTML file. PageMaker lets you create two kinds of HTML files: a text-only version that is essentially a stringing together of selected stories, and a page-layout version that attempts to duplicate your layout's look and feel within the constraints of HTML 3.2's specification. Whichever you choose, the process is basically the same, and you should expect to edit the HTML code to fine-tune the page's appearance.

1 Use the Export command in the File menu, and select HTML from the submenu. When the dialog box appears, click on the New button.

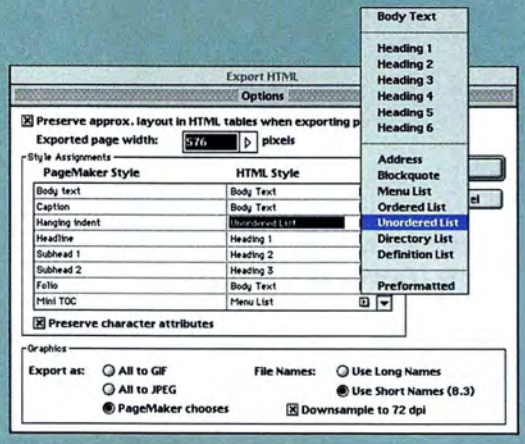


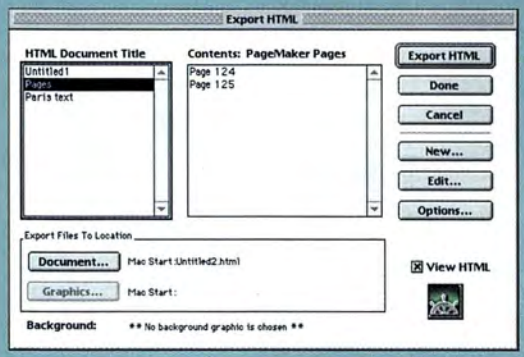
2 Here's where you decide if you want to export a sequence of stories or your page layout. In this screen, I've chosen the Assign Stories option, which exports just text. All PageMaker stories would be displayed in the list in the left-hand window. Select the ones you want—one at a time, in the order you want them to appear—and add them to the right-hand window. If you want to retain the settings you're about to make, be sure to enter a name in the Document Title field.

If you want to export whole pages, you'll get a list of pages in your document instead of a list of stories. Select the ones you want to export and add them to the right-hand window.

Remember that you're creating a page at a time, so export only stories or pages you want on a particular Web page. In the case of PageMaker pages, the PageMaker pages within a Web page follow each other, scrolling from top to bottom. In either case, when you're done, click on Done.

3 Whether you export stories or pages, be sure to go to the Options dialog box. This is where you set the pixel width for your page, determine how your graphics are embedded, choose DOS names versus Mac or Windows 95 long names, and map PageMaker styles to HTML styles. If you're exporting pages, you also tell the export facility whether to use the HTML tables facility to keep a multicolumn layout in PageMaker multicolumn on the Web. Click on OK when you're done.





little box at the right-hand side of the palette to the new layer. The item's handles will change color to match the new layer, and the pencil icon near the layer (which shows which layer is active, or *targeted*, in Adobe lingo) will also move to the new layer. Merely clicking on a layer name will make it the active layer, but that won't move the selected item to it.

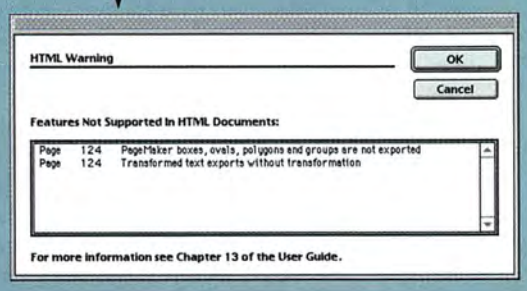
Notice the two boxes on the left side of the palette. The eye icon means a layer is visible—you just click on that icon to make a layer visible or invisible. Invisible layers don't print, so this is a fast way to print drafts, assuming your graphics are on their own layer. The other square is usually blank, but if you click on it, you get a do-not-write (the pencil with the slash) icon—this means the layer is locked and its elements can't be changed. Locking layers is faster than locking elements individually—and the ability to lock entire layers extends the benefits of

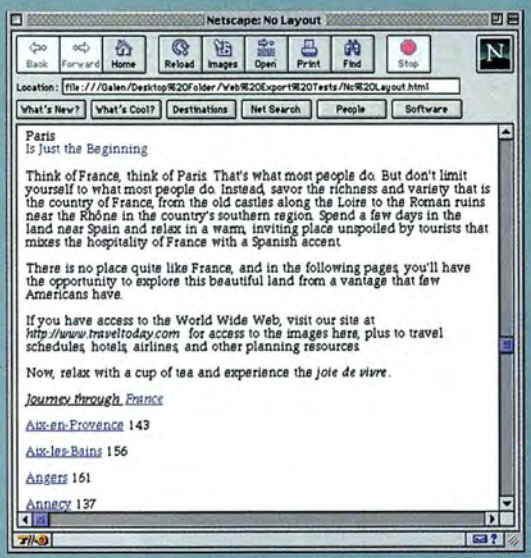
4 With everything set, you're ready to export your Web page. With the options at the bottom of the dialog box, you can automatically insert a background image on your pages, and you can choose a browser and have it launch to display your HTML file once the export is complete. To do the actual export, pick the name of the specifications you just made from the list in the HTML Document Title window. If you didn't provide a name, the name will be Untitled. (These names are part of your PageMaker document, so you can do the same export in the future without reentering all your options.) Now click on Export HTML. You're done.

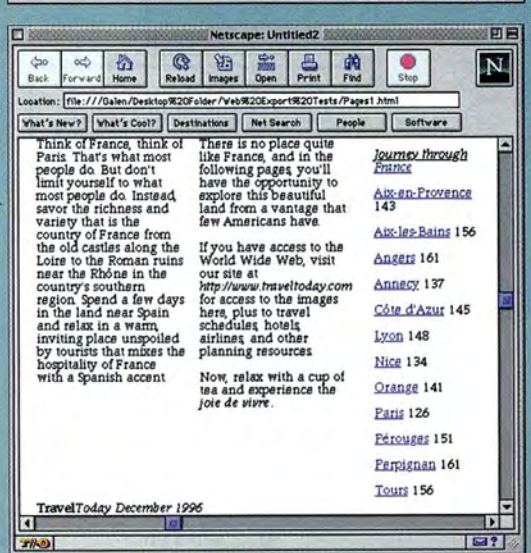
5 While exporting, PageMaker will tell you what PageMaker features can't be exported; this screen shows examples. Some you may not expect are graphics created within PageMaker and any image that bleeds off the page. The latter is trickier than it may seem: if the original image extends off the page and you crop it within the page boundaries, the image still won't export. The full image must fit within the PageMaker page to be exported.

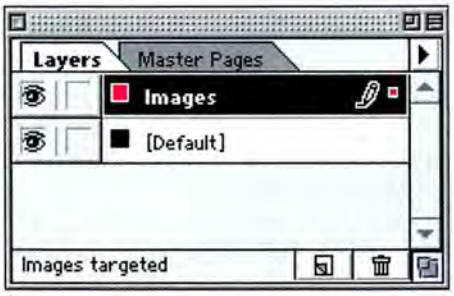
6 The results show the limitations of HTML. The story export is a basic page, with no bells and whistles. The page export will give you a more sophisticated page, but you'll still likely want to tweak it in a text or HTML editor.

Lori Birtley, a PageMaker product manager at Adobe who's been in the business for more than a decade, once told me that HTML is less sophisticated than what PageMaker 1.0 can do. She's right, so keep that in mind when your full-color, typographically sophisticated layout looks less stellar on the Web. If you want to retain all those attributes, you'll need to export to Adobe Acrobat format (which PageMaker can also do) and have your readers take a lot of time to download your files, or you'll have to use QuarkXPress with QuarkImmedia, with a similar penalty in file size and download time.

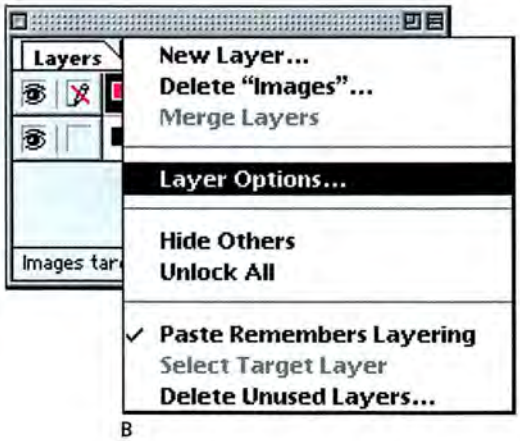






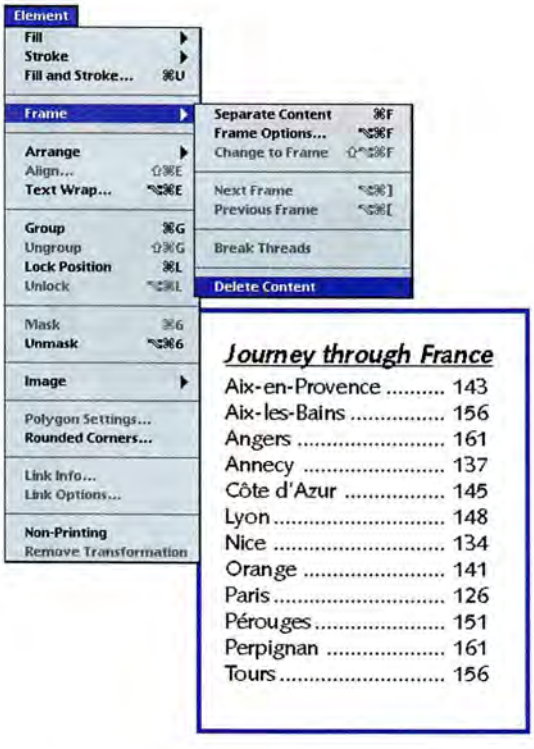


A



B

A Layer of Their Own The new layers capability lets you keep different elements apart, so you can hide them all at once or lock them so they are not accidentally moved. Uses include hiding slow-to-redraw images (**A**), keeping one layout for multilingual documents, annotating a publication with comments, and having multiple options for a layout in one file (**B**).



Frame Controls You can now combine text with boxes, or create a template layout in which the spots for text and graphics are predefined, by using the new frames feature. Frames let you create boxes in which text and graphics go; these boxes can have colors, fills, and ruling lines just like any other box—as in the content box shown here.

individual locking: you can share files among people and not need to worry about accidental edits or changes, as well as make it clear what they can and cannot work on. You can also access these features, as well as other layer controls, through the quick-access menu shown in the screen shots.

Other Enhancements

While there are small enhancements throughout the program—such as new Photoshop filters, the ability to export selected graphics to files, and a shortcut (⌘-drag) to copy elements—three enhancements that are not derived from Photoshop deserve special attention.

Frames After a decade of resistance, PageMaker has adopted the concept of frames, boxes that contain text or graphics. With frames—used in all competing programs—you can create a layout template and then add text and images into it. In previous PageMaker versions, you had to place text and graphics anew each time, using guides or your own memory to ensure they were in their proper positions and sizes.

But PageMaker doesn't throw away its original approach—instead, it grafts the frame approach to it. That's too bad, because it lessens frames' effectiveness. The screen shot "Frame Controls" shows the Frame submenu's options. The text block at right is combined with a rectangle. In previous versions of PageMaker, those are separate elements that you would have to group if you wanted to ensure they got moved or resized together. By converting them to a frame, you can work with them as if they were one element. And you can set parameters that ease layout, such as setting a margin within a frame. In the screen shot's example, that ensures that the text on the left doesn't butt against the rectangle's ruling line, since I set a frame margin that constrained the text's outer margins. In the old PageMaker, I would have had to resize the text by hand. If you later need to separate the elements in a frame, you can.

That's the good news. The bad news is that frames can contain only one column of text (or one graphic). Other publishing programs use frames to handle multicolumn text, which saves you the effort of aligning columns and lets you easily change the number of columns in a layout. In PageMaker, both are still manual jobs, even with frames. Given that even illustration programs now support multicolumn text, I'm perplexed at this continued omission in PageMaker.

Layout Adjustment Whether you need to print publications for different companies on different paper sizes or want to repurpose paper-based content for on-screen presentation, PageMaker has a tool to help you. When you change the paper size in the Document Setup dialog box (being changed to the size of a Web page in the screenshot series "The Resize Game"), you can click the

Adjust Layout option and have PageMaker rearrange and even resize your elements to fit in the new page size.

Obviously, there's judgment involved in such adjustment, so PageMaker lets you set some basic decisions through a Layout Adjustment Preferences dialog box. Even with those rules set the way you want, expect to fine-tune the adjusted layout manually. As you can see from the screen shots, PageMaker makes an attempt but can't guarantee a layout that works in the new size.

Plug-in Support In a direct steal from rival QuarkXPress, PageMaker no longer has a clunky setup for plug-ins. Before, except for some plug-ins that came bundled with PageMaker, they could appear only in a plug-ins menu. Now, they can appear wherever the plug-in developer thinks they should. QuarkXPress has always let plug-in developers integrate their features wherever it most made sense, but it took three PageMaker versions before the same was true of it.

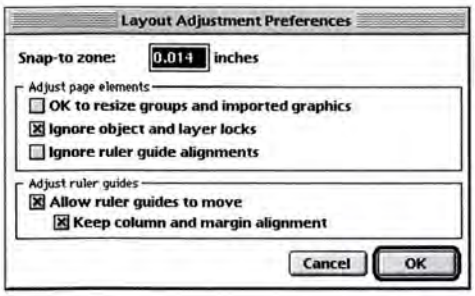
This means plug-ins will appear and act like any other feature, so you'll be able to use features in the context—in the menu, palette, or dialog box—that makes sense. (Of course, plug-in developers have to design them accordingly; otherwise, their plug-ins will still appear only on a separate plug-ins menu.) In fact, many of PageMaker's features are now implemented as plug-ins, which makes it easier for Adobe to revise them and add new ones without releasing a whole new PageMaker version.

The Last Word

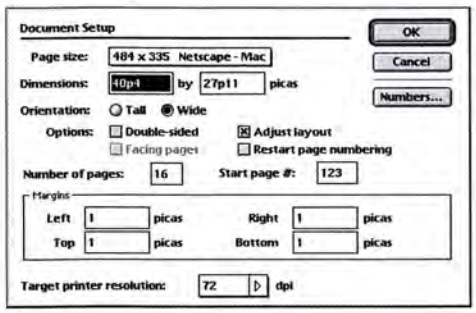
It's been just a year since the last PageMaker version appeared, and I was surprised to see Adobe so quickly revise the program—the company usually works in two-year cycles. Adobe explains the shorter cycle by pointing to the companywide synchronization of interfaces and the need to update HTML export tools to handle the latest version of the HTML standard. While not earth-shattering, the changes in PageMaker 6.5 are worthwhile, since they make this widely used layout tool truly easier to use. Existing features are often easier to access, and new features will be better integrated if developers use the new plug-in architecture effectively.

Adobe has been working hard to breathe new life into PageMaker, which had slipped badly in the race against its primary page-layout competitor, QuarkXPress. There's more work to be done to surpass QuarkXPress, whose layout tools remain more flexible and whose broad set of plug-ins makes it easier to customize it to your specific needs—but it's clear from this new version's ease-of-use innovations that PageMaker is seriously in the race again. m

Executive editor GALEN GRUMAN has coauthored four books on PageMaker and three on QuarkXPress. He also wrote the forthcoming *PageMaker 6.5 for Dummies Internet Edition* (IDG Books Worldwide, 1997).



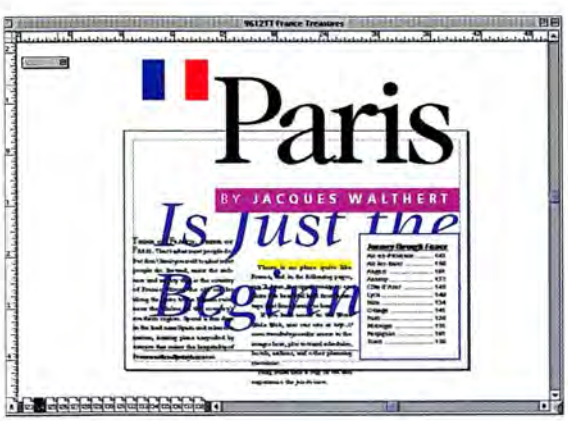
A



B

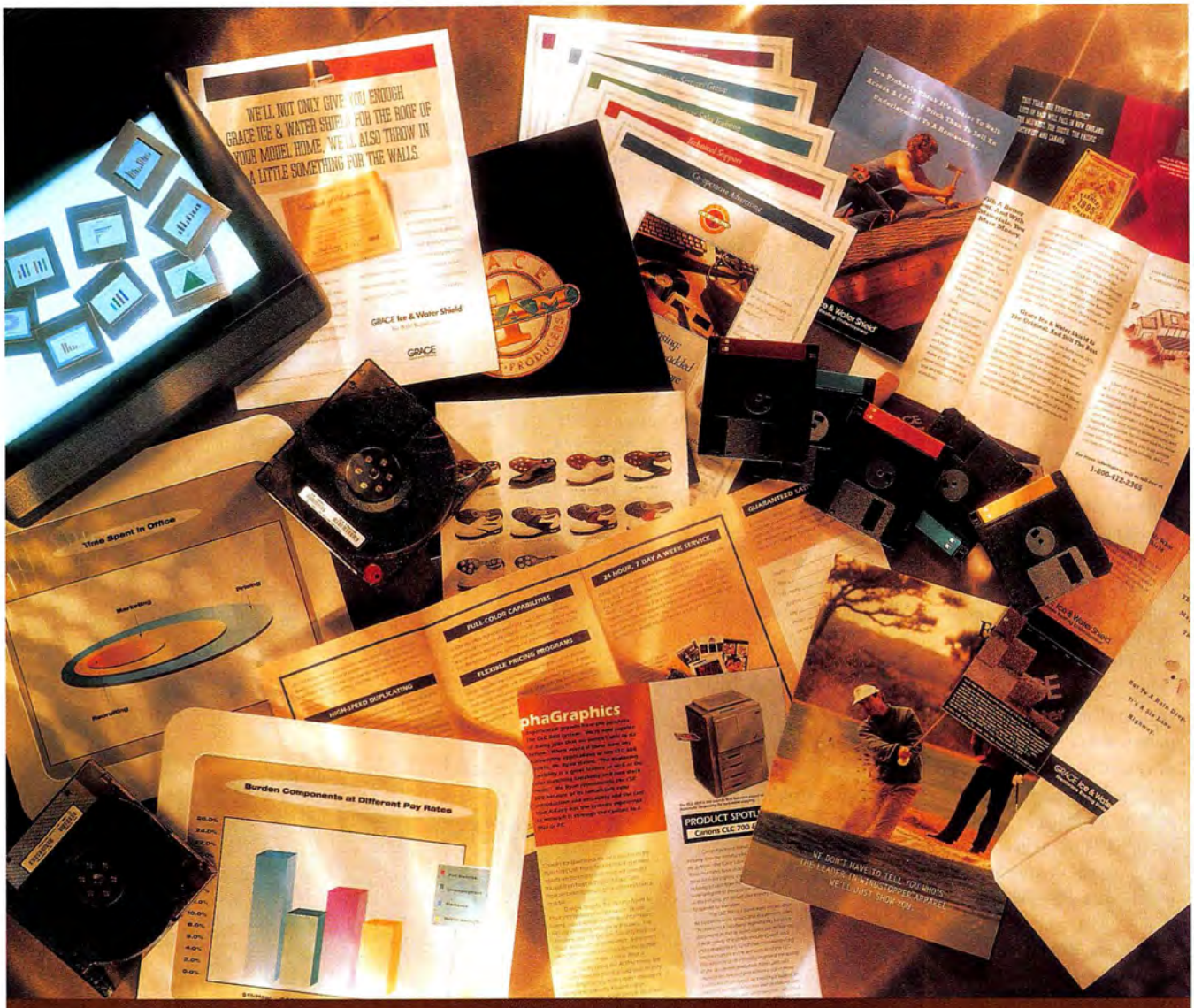


C



D

The Resize Game To help you resize and rescale publications designed for one size but needed to be output in another, PageMaker has an automatic layout-adjustment feature (**A**) whose rules you can modify (**B**). Radical changes in size, of course, will require human intervention, such as the resize from a letter-size page (**C**) to a Web page (**D**).



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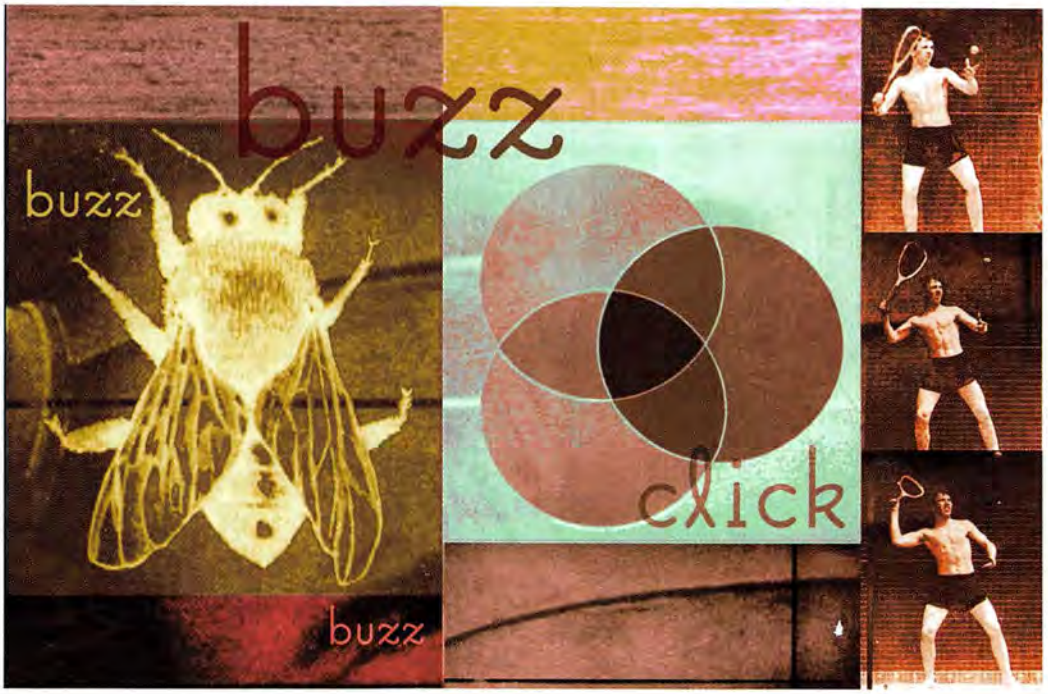
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by Barbara Assadi

Quark Goes Interactive

Easily add multimedia to your page designs

IF YOU'RE A PRINT DESIGNER who feels that the world of multimedia has passed you by, you're in good company. Up to now, the tools available for interactive publishing have been downright designer-unfriendly and have smacked more of computer programming than of graphic design or page layout. As you've wrangled with unfamiliar concepts, struggling with less-than-satisfactory presentations and Web pages, you've probably wondered why someone hasn't come up with a program that lets you capitalize on your print design skills as you migrate over to the interactive arena. Wonder no more.

Enter QuarkImmedia, a new product from Quark ($995; 303/894-8888, *http://www.quark.com*). QuarkImmedia is distinguished from other multimedia authoring programs by its use of the popular QuarkXPress desktop-publishing layout interface, which print designers will find comforting. Its range is wide: QuarkImmedia has no problem handling corporate presentations, such as what you might create with Microsoft PowerPoint or Adobe Persuasion, but it can also tackle sophisticated interactive projects, including richly designed CD-ROM presentations and Web pages. Appropriately, QuarkImmedia files are referred to as *projects*.

As a plug-in to QuarkXPress (or an XTension, in Quarkspeak), it includes all of the precise typographic and layout controls that have been the hallmarks of its print-publishing counterpart. Testing of QuarkImmedia (see *Reviews*, *Macworld*, December 1996) leads us to believe that you'll find it easier to learn than other authoring applications. In this article, *Macworld* shows you how to make the best use of QuarkImmedia's features. [continues on page 158 | How-to begins on page 156]

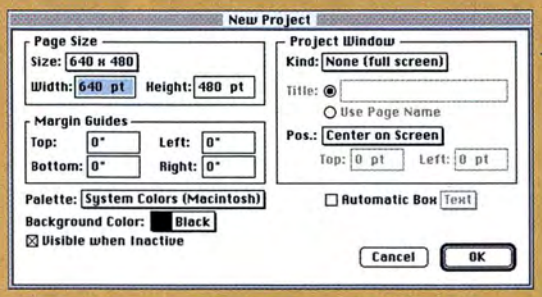
JENNIFER JESSEE

On the Same Page

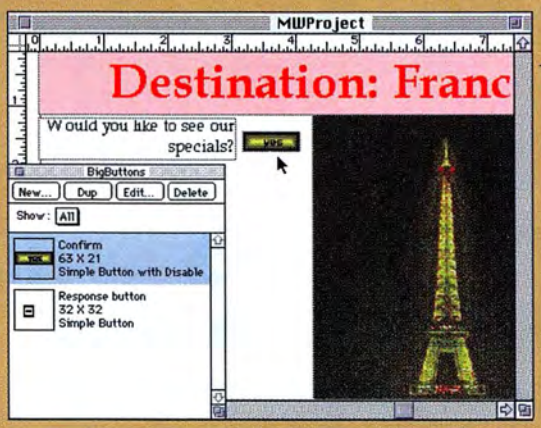
If you're familiar with QuarkXPress, you already know how to use QuarkImmedia, because the basic building block for both is the page. To build an interactive project, you simply create one or more pages and then fill these pages with text and picture boxes, just like those you use to design print projects in QuarkXPress. You bring the pages to life by adding sound, digital video, animation, hot text, and interactive buttons. Having used QuarkXPress for many print projects, I felt completely at ease with QuarkImmedia and was able to finish the project shown on these pages in just a couple of hours.

Pages with Zing

1 To create a new project, you start with QuarkImmedia's New Project dialog box, which lets you specify your project's size and color palette. You can also have QuarkImmedia take over the end user's entire screen without the intrusion of a menu bar—something that you can't always do in other multimedia applications.



2 The interface used to create a QuarkImmedia project looks the same as that used to create a QuarkXPress document. Here I've created two text boxes using QuarkImmedia's button editor, and used the QuarkXPress Measurements palette to size the text and modify its kerning. I've also created a picture box into which I imported the image of the Eiffel Tower. I dragged an interactive button—labeled *Yes*—onto the project from a button library.



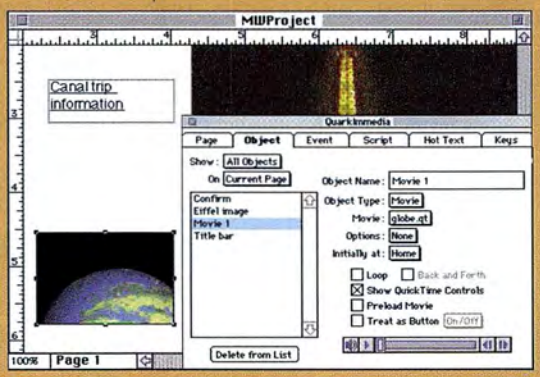
3 You can also make text interactive, using commands similar to QuarkXPress's Get Picture command. When a user clicks on the Canal Trip Information text, the screen will display the next page.



4 Now you're ready to tackle multimedia. Adding movies is also easy using QuarkImmedia's Object panel. First you create another picture box and fill it with a QuickTime movie. You can then check the Show QuickTime Controls box to have the movie's QuickTime controls displayed. That way, the project's end user can control playback. Other options let you loop the movie or represent it as a button.

5 You can associate a sound with an event using the Event panel. In this example, the watersound.au file will play when the end user clicks on the selected object (in this case, the Travel Information box). QuarkImmedia accepts sound files in Macintosh System 7, Windows .WAV, AIFF, AIFF-C, and .au formats. Its sound-handling capabilities are as good as they come, and include real-time streaming audio much like Progressive Networks' (206/447-0567, *http://www.realaudio.com*) RealAudio format.

Be aware that before you add sound to a QuarkImmedia project, you must use a separate sound-editing application, such as Macromedia's (415/252-2000, *http://www.macromedia.com*) SoundEdit 16, to sample sound at points between 44.1kHz and 5.5kHz. This difference is comparable to scanning an image at 600 dpi or at 72 dpi; simply put, the higher the kilohertz, the more realistic the sound.

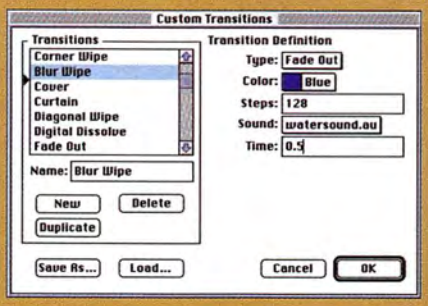


Though I didn't do so in this project, you can also specify certain text boxes as searchable text objects, but you have to be willing to sacrifice the precise typography of QuarkXPress. While you can control the appearance of text in other parts of a project, you can't control how the searchable text will look to the user. These fields—in fact, any that accept user input—look for the font used when the text box was created. If that font is unavailable, the program defaults to the system font of the user's machine.

6 Since QuarkXPress—and by extension, QuarkImmedia—works with Apple event scripts, you can use these scripts to affect actions in your projects. Simple scripting lets you build macros of actions—such as pausing for user input or running a video—that you pick from pop-up menus. Scripts can run other scripts; for example, you can build the sequence of screens that the user of a kiosk will see, and you can have scripts within scripts that reset the kiosk presentation to the opening page if there is no user input for a certain period of time. I used the predefined script actions that come with QuarkImmedia to create my own personalized Script1; it hides the cursor, displays a page, plays a sound file, displays a second page, and allows the user to interact with the project.

Effects Along the Way

1 QuarkImmedia offers other effects, including transitions—effects, such as fade-outs, that you can add between pages in a project or launch when objects are either displayed or hidden. You can use one of the 17 transitions that come with QuarkImmedia, or you can create your own. Here, I created a custom transition and named it Blur Wipe—it's a blue fade-out that will play my watersound.au file.

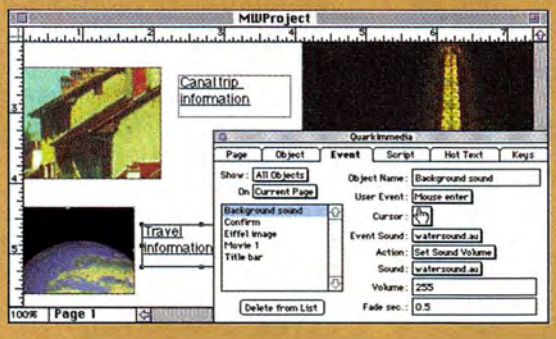


2 While transitions work well, QuarkImmedia tables are not as strong a feature. The QuarkXPress table editor is minimal—it lets you set tabs to line up decimals or other characters, or set them at a distance relative to the page's left margin. If you will be building many tables in your interactive project, you might want to consider a table extension, such as the $299 Tableworks Plus, from Npath Software (206/392-7745, *http://www.npath.com*). The table you create for the QuarkXPress page using Tableworks will look the same when it is exported into the QuarkImmedia project.



3 When you're done, you can preview the result to make sure it's ready to be used as a presentation or exported to a Web site. Simply press the F15 key to engage or disengage the project previews.





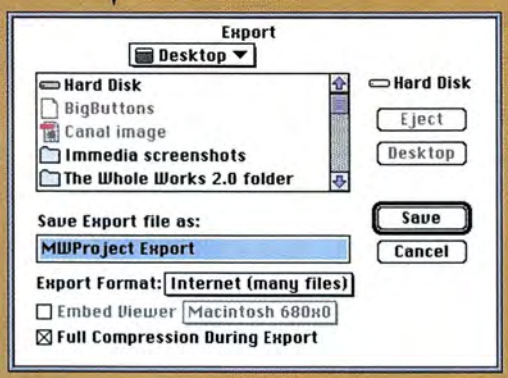


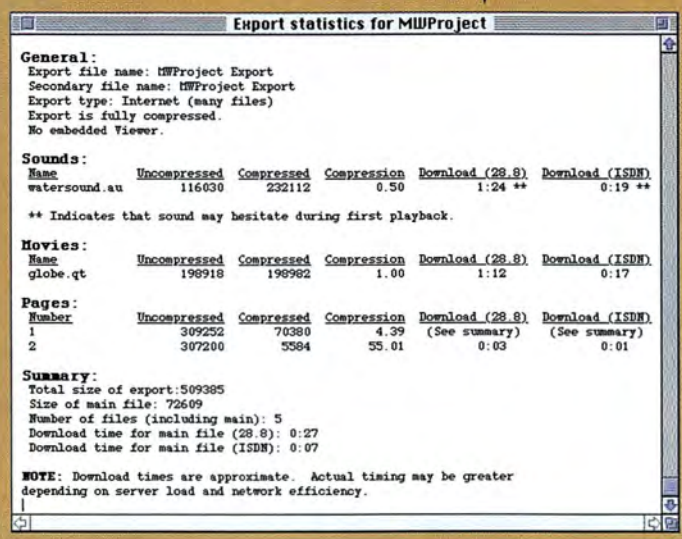
Export License

1 Now you're ready to export your project to the Web, a corporate intranet, or a CD-ROM. There are some issues to watch out for here. For instance, with the addition of sound, animation, and video files, QuarkImmedia project files are often substantially larger than their print counterparts. The two-page project shown here had a very small sound file and a short QuickTime video, but it weighed in at close to a megabyte.

While you create your project, keep in mind that, as with any other multimedia authoring tool, exported file size depends on content. If you design with low bandwidth in mind, you can make a project of manageable size, thanks to the program's ability to compress exported projects. Check out Quark's Web site (*http://www.quark.com/nt001.htm*) for a list of tips on how to keep your Internet exports at a reasonable size for modem users.

2 One nice feature in QuarkImmedia gives you a real-time preview of how long your project will take to download. To use this feature, you simply hold down the option key as you select Open from the File menu. Then you select a bandwidth from the Simulated Speed pop-up menu and open the QuarkImmedia project to preview it at different modem speeds.





Design and View

QuarkImmedia is made up of two parts: a design tool and a viewer. The design tool works with QuarkXPress to let you turn pages into multimedia presentations. You can add sound, video, interactive buttons, hot text, and animation to these projects. Since it is based on QuarkXPress, the design tool supports the same graphics and text formats.

QuarkImmedia's viewer, a royalty-free application embedded in your finished project, lets users open, view, and interact with the project. The viewer does not require QuarkXPress to run and can be downloaded without charge from Quark's Web site. For Web-page projects, the viewer serves as a helper application to Internet browsers.

The Last Word

If you're a multimedia developer who has been using HTML to build interactive projects, you might be more reluctant than print mavens would be to make the move to QuarkImmedia; after all, QuarkImmedia neither creates nor imports HTML tags. But anyone who has used HTML knows the frustration of trying to build a complicated table when you can't see what you're doing, or being limited to displaying text in the fonts available on the user's system. If you are into highly designed, typographically sophisticated multimedia projects, consider giving QuarkImmedia a try.

Of course, you'll have to learn new skills to accommodate sound, animation, and digital video. But QuarkImmedia's advantages are many. You can retrofit existing Quark-produced pages with interactivity. And, since it requires a familiar product, QuarkImmedia will make creating eye-catching multimedia content an easier job. **m**

BARBARA ASSADI manages creative programs for Oracle. She has coauthored four books on QuarkXPress, including *Macworld QuarkXPress 3.2/3.3 Bible* (IDG Books Worldwide, 1993).

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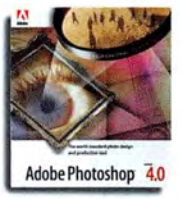




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Secrets

The Word 6 Survival Kit

STOP WHINING ABOUT WORD AND TURN IT INTO A BETTER PROGRAM

by Joseph Schorr



Everyone loves complaining about Microsoft Word 6: it's bloated with unnecessary features, it's too slow, it's too big, it's too Windows . . . Enough already. Let's stop talking about what Microsoft *should* have done with the best-selling Macintosh word processor and start turning Word 6 into the powerful, feature-packed, word-crunching machine it was meant to be. Follow the tips in this survival guide, and you might even be *glad* you're using Word 6.

Tool-bar Cleanup

Of course you hate Word's tool bars—there are ten of them, and if even half are open there's barely room on screen for documents. But those tool bars are totally in your control. Using the tool bars Microsoft provided straight out of the box is a form of self-torture. Instead of hiding and displaying several tool bars, each containing a few useful buttons, make your own compact, clever tool bars containing only the commands you really need.

To illustrate: The default Standard tool bar contains a few genuinely useful items, such as the multilevel Undo, the Format Painter, and the Insert Table buttons. But it also holds buttons for such mundane commands as Copy, Cut, and Paste. Now, honestly, when's the last time you used a *button* to copy and paste text? Rather than display this tool bar as is, trash those buttons you never use and replace them with others that will really help you get your work done.

To get rid of a button on a tool bar, hold down the ⌘ key and drag the offending button into the document window. To move a button from one tool bar to another—or to another location on the same tool bar—⌘-drag it to the new location. (You can also duplicate a button by option-dragging it.)

Using this technique, you can create a completely new tool bar containing only the buttons you find useful. You can even create new buttons for commands that Microsoft didn't think should be on a tool bar, but you do (see the sidebar, "Better Buttons"). Instead of staring at a cramped, claustrophobic tool-bar–intensive interface, you'll see one tool bar, with each button positioned exactly where *you* think it should be.

Shortcuts on Demand

Of course, if you're a hard-core typist and prefer to operate from the keyboard,

continues

RICCARDO STAMPATORI

Better Buttons

Word lets you do more than rearrange existing tool-bar buttons; you can also create brand-new buttons from any of the program's commands. Text buttons—those emblazoned with a text label instead of a tiny icon—are especially handy because it's easy to remember what they do.

I like to create text buttons for each of the styles I apply frequently and keep them in one tool bar.

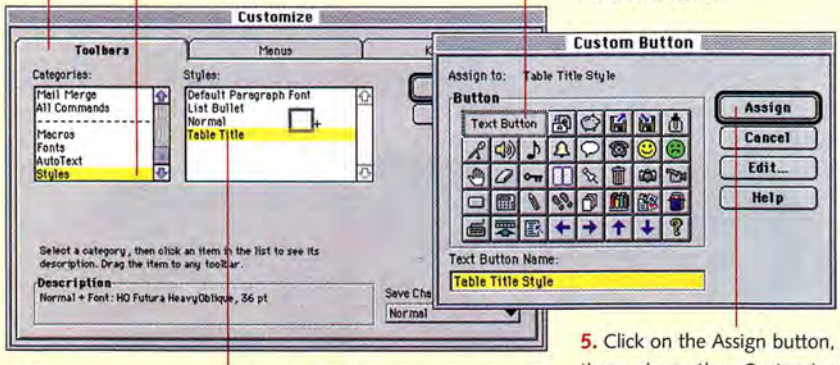


Here's how to do it:

1. Open the Customize dialog box and then click on the Toolbars tab.

2. In the Categories field, scroll to the type of command you want to create a button for. In this case, choose Styles, at the bottom of the list.

4. The Custom Button dialog box opens. At this point, you can choose an icon for the button, or simply type the name of the button into the Text Button Name field to create a text button.

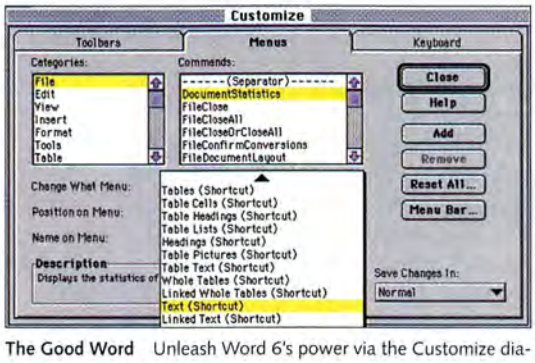


3. The name of the central field changes to Styles. Click on the name of the style you want to convert to a button and drag it onto an existing tool bar, or onto the document window to create a new tool bar. You'll see the outline of a button with a tiny plus sign when you drag.

5. Click on the Assign button, then close the Customize dialog box.

you can turn every one of Word's tool-bar buttons into a keyboard shortcut, thereby saving yourself lots of time and mouse-clicks.

The Standard tool bar, for example, contains a pop-up menu that lets you zoom in or out of a Word document, up to 200 percent. That's a useful feature, but not terribly convenient. Why not create shortcuts for View at 100 Percent and View at 200 Percent so that you can change magnification with a single keystroke? Choose the Customize command from the Tools menu, click on the Keyboard tab, then choose All Commands from the scrolling list of Categories. To assign a keystroke, click on the command you want in the list of commands, then click in the Press New Shortcut Key field and type the keystroke of your choice. Finally, click on the Assign button. No more complaining about obscure commands deeply buried in Word 6's dialog boxes; any one of those commands—any font, style, macro, formatting attribute, and so on—is now just a single keystroke away.



The Good Word Unleash Word 6's power via the Customize dialog box. Add your most-used commands to the 24 Shortcut menus (listed under Change What Menu), and you can pop up the ones you want by control-clicking on the appropriate part of the screen.

Menus Made to Order

Most seasoned Word users know about the program's shortcut menus: you can hold down the control key and click the mouse anywhere in a Word window to reveal a pop-up menu containing a short list of frequently used commands. The commands in the shortcut menus change depending on *where* you click. Click on text and you get formatting and editing commands; click on a tool bar and you get tool-bar–customizing commands.

What most people don't know, however, is that *you* can take charge, choosing exactly what appears in those shortcut menus. This means you can control-click your way to virtually any commands you want. For example, you can create a menu of your ten favorite fonts and have the font menu pop up right under your mouse whenever you control-click on a selection of text. That's *better* than Word 5's old Font menu.

To add items to a shortcut menu, open the Customize dialog box and click on the Menus tab. Use the pop-up menu named Change What Menu to select one of the shortcut menus—these are the ones that contain the word *Shortcut* in parentheses (see the screen shot, "The Good Word"). Then add items from the Commands field to the menu in any order you wish.

The Font Factor

The more fonts you have loaded in your system, the longer it takes for Word to launch. If you're looking for sheer speed, clean out fonts you don't really need, or use a font-management program, such as Symantec's Suitcase, to create a small font set for use with Word. In my tests, reducing the number of open font suitcases from 60 to 16 cut Word's launching time in half. I know, I know—you shouldn't have to do this; a well-designed word processor should be able to handle *hundreds* of fonts without noticeably slogging down. But if you play by Word's rules, you'll be rewarded with a program that loads faster. **m**

Contributing editor JOSEPH SCHORR used a highly streamlined, heavily tweaked version of Word 6 to coauthor *Macworld Macintosh Secrets*, fourth edition (IDG Books Worldwide, 1997).

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Quick Tips

Tips, Tricks, and Shortcuts

by Lon Poole

The next time you need to look through a plain text document—especially if you want to find specific text in it—try the Note Pad. John Burwell of Angleton, Texas, noticed that although the Note Pad has no Open command in its File menu, it can display the contents of a plain text document, including both types of SimpleText documents and text clipping files. To view a text file, you simply drag its icon to the open Note Pad. Reasons for using the Note Pad: it opens instantly; ordinarily it uses less than half the memory of SimpleText, BBEdit Lite, or Tex-Edit Plus; and unlike SimpleText, Note Pad has a Find command. The Note Pad can't create new files, but you can create new Note Pads by duplicating the one in your Preferences file. Drag the duplicate file to any folder (perhaps a folder named Note Pads in the Apple Menu Items folder), rename the duplicate if you wish, and double-click the file to open it.

Fragmented Memory

Q Is there any way for me to defragment my RAM without having to restart? A shareware program, perhaps?

ALLEN MANN
Caldwell, Idaho

A Memory fragmentation can occur as a normal side effect of quitting applications and desk accessories unless you quit them in exactly the reverse order that you opened them. When you quit them out of order, the resulting unused blocks of memory are separated by blocks of memory still in use by open applications. The Mac OS can reallocate the separate unused blocks one by one, but it can't combine them into one large block of unused memory.

In many cases you can fix memory fragmentation by quitting all open applications and then reopening the ones you want to continue using. That process should consolidate the open applications in contiguous blocks of memory and leave one large block of unused memory. There are a couple of shareware utilities that quit all open applications and desk accessories: Quit All Applications 2.0 by David Giandomenico and ClosingTime by Vinay Prabhakar. Current versions of these utilities do not quit faceless background applications, which do not appear in the Applications menu or in the About This Macintosh box, but most faceless background applications open before regular applications and thus do not contribute to memory fragmentation.



Sometimes quitting all open applications does not cure memory fragmentation. For example, if you use Open Transport 1.1, a standard part of System 7.5.3 and 7.5.5, memory can become fragmented if the TCP/IP control panel's "Load only when needed" option is turned on (this is the default setting). With that option on, Open Transport 1.1 allocates a block of memory for TCP/IP networking right after you open the first TCP/IP application, such as a Web browser or e-mail program. If you later quit the TCP/IP application and all other applications you have opened, memory may remain fragmented by the block of memory allocated for TCP/IP networking. Open Transport 1.1 releases this block of memory after about two minutes of no TCP/IP activity, except with some types of PPP (dial-up) connections. Once the TCP/IP memory is released, you can quit all open applications to clear up fragmented memory.

Open Transport 1.1.1 (available at *http://www.info.apple.com*) is not supposed to fragment memory on PowerPC Macs. With other Macs and Open Transport 1.1, the best way to avoid memory fragmentation is to turn off the "Load only when needed" option. Open Transport 1.1.1 must be installed over Open Transport 1.1, which you can install separately from the System 7.5.3 disks or CD, or the System 7.5 Update 2.0 disks or CD (see the next item if you need to install Open Transport 1.1 on top of System 7.5.5).

Open Transport considerations aside, you can minimize memory fragmentation by paying careful attention to the order in which you open applications and desk accessories. First open the applications and desk accessories you are least likely to quit, and then open the ones you are most likely to quit in a work session. True control panels do not count, since they

continues

JEFFREY FELD

are part of the Finder. But "control panels" that are listed in the Applications menu when they are open, such as Desktop Patterns, are actually applications and do affect memory fragmentation.

Owners of Performa and Power Mac 52XX, 53XX, 62XX, and 63XX models can't install Open Transport 1.1 (as suggested in January *Quick Tips*), but they can install Open Transport 1.1.1, according to Adam Wunn of Portland, Oregon. The installer checks for a hardware bug on those computers and won't install Open Transport 1.1.1 until the bug is fixed. Repairs are free from Apple-authorized service providers under a seven-year warranty-extension program. Open Transport 1.1.1 is available free on the Internet (*http://support.info.apple.com/ftp/mirrors.html*) or by mail ($13; 800/293-6617 to order).

Bugs and Turkeys



Deneba's Canvas 5.0 can do a lot of things, but it can't import SimpleText files, as J. Prokop of Media, Pennsylvania, points out. Deneba is aware of the problem and hopes to have a fix ready with version 5.01b or 5.02. Watch Deneba Software's Web page (*http://www.deneba.com*) for updates, or call Deneba at 305/596-5644.

Macworld will send you a Bug Report or Turkey Shoot T-shirt if you are the first to inform us of a turkey or a serious, reproducible bug that we report in this column. See How to Contact Macworld.

Custom Install for System 7.5.5

Q. I wanted to install System 7.5.3's Control Strip by choosing Custom Install from the Installer's pop-up menu as described in the November 1996 *Quick Tips*. But I just updated to System 7.5.5 and the Installer wanted no part of it. Is there any way to still install Control Strip, and if so, are there any other goodies I might have overlooked? I already found Gerbils and the additional desktop patterns in the CD Extras folder.

BILL SWEENEY
Hicksville, New York

A. To install Control Strip or another individual item like PlainTalk into System 7.5.5, you must use the installation disks or CD for System 7.5.3 or System 7.5 Update 2.0, because the System 7.5.5 Update disks do not include a full set of system files. That's no problem with the System 7.5.3 disks or CD—just choose Custom Install from the Installer's pop-up menu and select the items you want from the hierarchical list. But System 7.5 Update 2.0's Installer won't let you do a custom install on top of System 7.5.5. The solution is a special Installer script named Sys 7.5 Upd 2.0 Custom Install, which is available from the Unsupported folder of Apple's Software Updates Library (at *http://www.info.apple.com*, and on America Online, keyword *AppleComputer*). Be sure to back up your System Folder and follow the instructions that come with the special script.

Other items you might want to install individually include Desktop Printing (although there's a newer version in Apple's Software Updates Library as part of LaserWriter 8.4); Easy Access, which lets you move the pointer with the numeric keypad, type a key combination one stroke at a time, and so on; and Close View, which can magnify the display image. In addition, System 7.5 Update 2.0 can custom-install just the WorldScript Power Adapter extension, which, as I explained last month, contains the Power-PC-native versions of many Mac OS text-handling routines used with many Western languages. With the System 7.5.3 Installer you have to install all of WorldScript I or II, which includes files needed only for other languages, namely InputBackSupport and either the WorldScript I extension or the WorldScript II extension.

File Locking

Q. I share a PowerBook with several colleagues, and I want to use a password to protect a single sensitive document. I can't find anything in file sharing to help me. Can I password-protect individual files on my PowerBook?

ANDREW CRIPPS
Vancouver, British Columbia, Canada

A. In addition to the commercial software discussed in "Secure Your Mac" (November 1996), there are several low-cost shareware utilities. The $10 shareware application Big Al FileLock 2.03 by Al Staffieri Jr. locks document or application files so they can't be opened without the password. The program provides basic security with a basic interface. You select one file at a time to lock or unlock from a directory dialog box—no drag and drop. Someone who knows how to use a resource- or disk-editing program could crack FileLock's locking scheme and pretty easily extract the text.

For better security, you can lock and encrypt files with the $10 shareware MacEncrypt by J. Clarke Stevens. It supports drag and drop of one or more files, but not folders. Another shareware encryption program, the $25 QuickEncrypt 2.2 from Dejal Userware, lets you drag and drop multiple files or folders and optionally combines them into one encrypted file. It's by far the most versatile shareware encryption and locking utility. The $30 shareware compression utility StuffIt Lite 3.5 from Aladdin Systems (408/761-6200, *http://www.aladdinsys.com*) can encrypt and lock files and folders, although it doesn't support drag-and-drop encryption as the commercial version, StuffIt Deluxe 4.0, does.

Monitor Interference

Q. The picture on my 17-inch Apple multiple-scan monitor began shaking sideways when I moved to a new apartment. Moving the system to other electrical outlets doesn't help, but turning off all my lights and appliances cures the problem. The landlord is sending an electrician to evaluate the problem. Is my Mac or the display damaged? Is there a problem in the apartment?

ADAM DLUZNIEWSKI
New York, New York

A. Electrical current induces magnetic fields that can cause monitor jitter and color shifting. Typical residential and commercial wiring doesn't cause a problem because the two wires in a circuit carry current in opposite directions and induce magnetic fields that cancel each other out. Certain wiring problems interfere with that self-canceling effect and cause jitter. If turning off all electrical devices in an area (room, apartment, house, building) stops the jitter, then the

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wiring problem must be in that area. Have an electrician check junction boxes, circuit breaker panels, and other places where the neutral (white) wires of two circuits are connected together. That wiring technique doesn't create an electrical hazard, but it can generate large magnetic fields because the current for one circuit flows full strength in one direction through the circuit's hot (black or red) wire, but half-strength in the other direction through both circuits' white wires. The electrician should be able to fix that wiring problem fairly quickly and easily. It's harder to fix the magnetic fields inherent in knob-and-tube wiring, which was the most common wiring method until about 50 years ago. With knob-and-tube wiring, a circuit's hot and neutral wires are typically about ten inches apart and can't cancel each other's magnetic fields as effectively as the adjacent wires used in more modern wiring.

If it's not feasible to fix a wiring problem in your area, or a problem outside your area is responsible for your monitor's jitters (turning off all electrical items doesn't eliminate the jitter), then you can buy a shielding enclosure for the monitor. A custom enclosure made of mu-metal, an expensive alloy of nickel, iron, and molybdenum long used by the Department of Defense to shield sensitive electronic components, costs several thousand dollars. Field Services (310/605-0808, *http://www.fms-corp.com*) makes adjustable enclosures lined with a similar but less costly alloy in three sizes that cost from $600 to $800.

Color shifting and smearing is caused by DC magnetic fields, which ordinary residential and office wiring does not induce. For example, Tiit Telmet says this problem plagues his office and many others in Toronto, Canada. After a year of sleuthing, he determined the cause to be the public transit's DC electrical lines, which run outside his office windows. In this instance, his only remedies are to move his office or buy shielding enclosures.

Drop and Pop Caps

A PARAGRAPH THAT BEGINS WITH the drop cap *L* or *A* (1) (or *R* in some fonts) often looks better if you close up some of the white space between the top half of the drop cap and the remainder of the word (3).

Father Pachomius of the Holy Transfiguration Monastery in Brookline, Massachusetts, notes that in QuarkXPress you can close up the space by highlighting the drop cap and adding negative tracking (–30 in this example), but the drop cap collides with the last line next to it (2). To fix the problem, click at the end of the line above the collision, type shift-return to break the line manually without starting a new paragraph, and then type an extra space or so to bring the colliding line clear of the drop cap (3). (If you later eliminate the drop cap, don't forget to delete the line break and any extra spaces you typed.)

To make a "pop cap," that is, an initial cap that rises up out of the paragraph instead of being embedded in it, insert a line break right after a drop cap (4). Do not add negative tracking to the pop cap.

LEADING is the spacing between lines of type. Especially in larger works like books and magazines...

(1)

LEADING is the spacing between lines of type. Especially in larger works like books and magazines...

(2)

LEADING is the spacing between lines of type. Especially in larger works like books and magazines...

(3)

LEADING is the spacing between lines of type. Especially in larger works like books and magazines...

(4)

Sticky Menus

TIP For those who envy the sticky menus of Windows 95, get a programmable mouse with more than one button, such as Logitech's Trackman Marble or Kensington's Thinking Mouse. If you assign a drag-lock function to one of those buttons, then you just have to place the cursor in the menu bar, click your drag-lock button, and your menus stay open with no strain on your fingers. To choose a menu item, highlight it and single-click with the main mouse button. This is especially handy with hierarchical menus, where you have to navigate levels of menus and sometimes backtrack.

KERRY SMITH
New York, New York

You can also get drop-down menus by installing Night Light Software's (http://www.nlsoftware.com) *$15 shareware control panel AutoMenus 3.2.1.—L.P.*

Cookie Blocker

TIP While reading the series of *NetSmart* articles about Web-browser "cookies" on Macworld Online (*http://www.macworld.com/netsmart/*, I realized that they didn't mention perhaps the easiest way to eliminate a cookie. On the Macintosh, a folder can't replace a file, and vice versa. You can use this fact to eradicate cookies. Simply copy the name of the cookie file (MagicCookie in Netscape, cookies.txt in Internet Explorer), delete the file, make a new folder in the same place, and rename the folder by pasting the copied name.

DAVID VASILEVSKY
Montreal, Quebec, Canada

LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is *Macworld System 7.5 Bible*, third edition (IDG Books Worldwide, 1994).

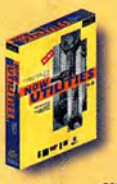
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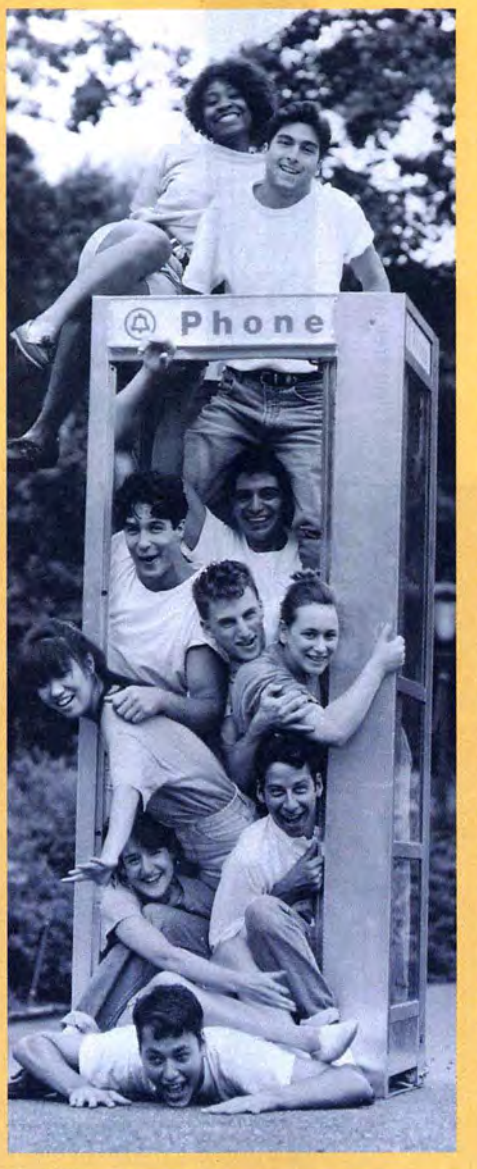
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NetSmart

All News, All the Time

by Cameron Crotty

Time. None of us have enough—just ask the hamsters working the treadmill at your local gym while reading the newspaper or watching TV. There's more information out there than ever before, and even the most voracious surf rats can't digest it all.

You could browse the home pages of the major services like CNN or c|net and pile your plate with world affairs, sports updates, and entertainment-industry gossip, but most of the big sources load their sites with pretty pictures and hard drive–soaking movie clips to keep your eyes glued to their pages while they rack up the hit counts for their advertisers. If you prefer tearing sweet chunks of fresh meat from the information bone to chewing on multimedia lard, then we've got a tableful of high-protein info fixes for you. And the best part is (for the time being) they're all free.

You still haven't figured out the whole HTML thing? Check out "Framing the News" for instructions on building a page of your favorite links, and save your Bookmarks menu a lot of abuse.

Sharpen Your Nose for News

We know that you want to skip straight to the funnies and the sports section, but you're going to look awfully dumb at tonight's dinner party if you don't know which third-world country the United States declared war on today. Therefore, we start our tour of high-content news services with the heavy-duty front-page headlines and the business section.

Once you've done the setup work, our favorite hard-news fix—Mercury Mail (*http://www.merc.com*)—delivers the good stuff directly to your e-mail box. Mercury Mail takes stories from sources like Reuters, Tribune Media Services, and ESPN, and selects and edits them into several e-mail news feeds, segregated by topic. For instance, you can choose a general news feed or specialized stock information based on a portfolio of companies you want to follow.

Mercury also offers sports, entertainment, weather services, and even ski reports (hey, these guys live in Denver). The frequency of the mailings depends on which service you subscribe to, and some services offer emergency alert mailings for hot stories. While the entertainment and weather offerings could use some work, the news, sports, and stock mailings really shine. If you were stuck on a desert island with only one Internet news source, you'd have to go a long way to beat the convenience of Mercury Mail.



BRIAN BIGGS

If you want to go directly to the wire stories without intervening editors, both Reuters and Associated Press have several live feeds on the Web. The *Tampa Bay Tribune* has perhaps the best no-muss access to AP's breaking news (*http://www.tampatrib.com/ap/breaking.htm*). The *Washington Post*'s AP news feed requires a little more manipulation, but you can search for stories that interest you; link to the searches page at *http://www.washingtonpost.com/wp-srv/searches/mainsrch.htm#ap* and set the Date Range pull-down menu to Within 1 Day to get a list of the latest stories. AP also does hourly summaries that you can find by typing **top news** into the Headline field.

The Reuters site is heavily designed and cluttered with lots of pictures and bells and whistles, and is often more trouble to surf than it's worth for a quick fix of news. But the Reuters feed is available without the extras if you link to *http://www.yahoo.com/headlines/news*; hourly summaries are also available at *http://www.yahoo.com/headlines/news/summary.html*.

The business of America is business, and if you have any interest in what's happening in the financial markets, add Quote.com (*http://www.quote.com*) to your portfolio of quick and dirty links. You can look up current market data on any publicly traded company—all you need is the ticker symbol (Apple Computer is AAPL, for instance). The

continues

FRAMING THE NEWS

Netscape's Frames HTML tag has proved to be something of a mixed blessing, giving site designers inviolable real estate for both navigation tools and advertisements. Also, early browser implementations of the Frames tag were, shall we say, less than stable.

However, you can use the Frames tag to create an elegant way to navigate a list of Web news links, setting aside a portion of your browser's window for your list of links, and opening those links into an adjacent frame.

Using the Frames tag splits the browser window into two or more areas, each of which can display a different URL. All you really need to create your very own Frames-based Hot News Page is a text-editing program, but even if you are using a WYSIWYG editor, seeing the code will help you understand what's happening beneath the HTML hood.

Begin by creating a folder where your Hot News Page project will reside. By the time you're done, you'll have created three HTML pages, and you'll want them all in the same folder.

1

Main Page

```
<HTML>
  <HEAD>
    <TITLE>Hot News Page</TITLE>
  </HEAD>
  <FRAMESET COLS="140,*">
    <FRAME SRC="Menu.frame" NAME="menu" SCROLLING=NO NORESIZE>
    <FRAME SRC="Viewer.frame" NAME="viewer" SCROLLING=YES>
    <NOFRAMES>
      <P>This page can only be viewed with a frames-capable
      browser</P>
    </NOFRAMES>
  </FRAMESET>
</HTML>
```

Main Page

Create this page and save it as Main Page in a folder called Hot News Page. Launch this page when you want to check out your hot news.

1a

<FRAMESET COLS="140,*">

This line divides your browser window into two adjacent columnar frames (**<FRAMESET ROWS="140,*">** would create two stacked frames). The first (left-hand) frame will be 140 pixels wide, and the asterisk (*) tells your browser that it should assign the remaining available window space to the second (right-hand) frame. You can hard-code the size of your frames by specifying the pixel count of both frames. You can also divide up your window using percentages—for example, **COLS="20%,80%"** will create two columnar frames occupying 20 and 80 percent of the available window space, respectively.

1b

<FRAME SRC="Menu.frame" NAME="menu" SCROLLING=NO NORESIZE>

<FRAME SRC="Viewer.frame" NAME="viewer" SCROLLING=YES>

The first tag gives the source HTML file for the first frame (Menu.frame), names the first frame menu, and sets the first frame so that it has no scroll bars and cannot be resized by the user. This frame will contain your list of news links. The second **<FRAME SRC>** tag gives the source HTML file for the second frame. See number 2.

1c

<NOFRAMES>

<P>This page can only be viewed with a frames-capable browser </P> </NOFRAMES>

This is the text that will be displayed if you load this page with a browser that can't handle frames.

stock quotes run 15 minutes behind the actual market action, but this is typical for a free online stock-quote service. If you need to get any closer to the game, you'll have to pay for a trading service that gives real-time information. One of the great features of Quote.com is that the service will save a portfolio of up to seven stocks for you.

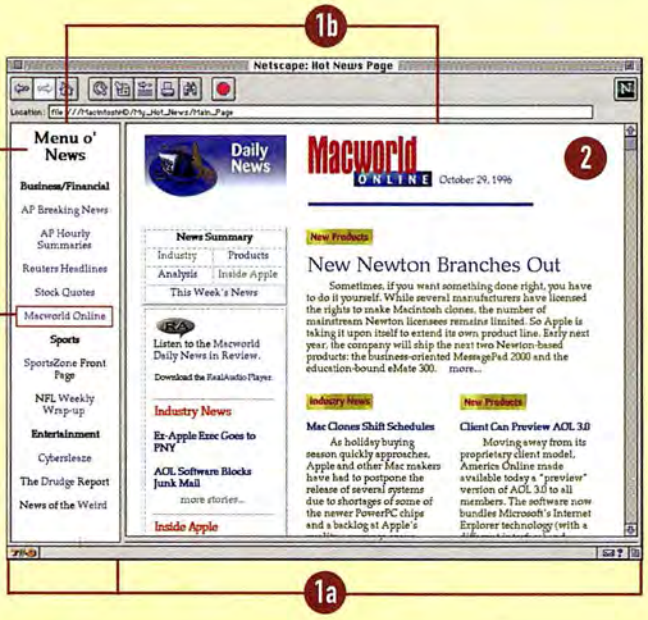
Of course, for the latest dope on what's happening in the world of Macintosh, set your sights on *Macworld*'s own Daily News page (*http://www.macworld.com/cgi-bin/dailyads.pl/daily/dailynews.main.shtml*), and soak up the coverage by the crack *Macworld* news squad.

Slide into Home

World War III aside, what could be more important than finding out whether or not the Knicks covered the spread, or if Marino scored last night? Finding free sports information on the Web is a cakewalk—ESPNet's SportsZone is miles ahead of the competition, and while much of the content will cost you extra, the juicy news nuggets are generally free.

The site is well organized, but you have to download and drill through a lot of multimedia and editorial content if you go in through the front door, although SportsZone's mostly textual front page, at *http://www.espn.com/index.text.html*, gets this month's NetSmart Bandwidth Preservation Award for low-fluff, high-content presentation. Still, the best game plan is to build links directly to information pages within the site.

Depending on what sport you're interested in and whether you're looking for the scores or the stories, you may want to link to the box scores, the game recaps, or in the case of the NFL, the slick weekly wrap-ups (*http://www.espn.com/editors/nfl/weeklyrecap/index.html*). Unfortunately, getting detailed information about your favorite team requires a subscription, but you can always read up-to-the-minute stories off ESPN's SportsTicker for free by link-



2

Viewer.frame

```
<HTML>
  <HEAD>
    <TITLE>Viewer Page</TITLE>
  </HEAD>
  <BODY>
    <P>Your News Goes Here!</P>
  </BODY>
</HTML>
```

Window to the World

Create a page with the following HTML code and save it as Viewer.frame in the Hot News Page project folder.

This is a placeholder page that comes up in the viewer frame when you first launch your Hot News Page. You can change the text, or you might choose a favorite URL that you want to launch first, like the Macworld Online News page shown here.

3

Menu.frame

```
<HTML>
  <HEAD>
    <TITLE>Menu o' News</TITLE>
  </HEAD>
  <BODY BGCOLOR="#ffffff">
    <P ALIGN=CENTER><STRONG><FONT SIZE=+2>Menu o'
    News</FONT></STRONG></P>
    <P ALIGN=CENTER>
    <A HREF="http://www.macworld.com/cgi-bin/dailyads.pl/daily/
    dailynews.main.shtml" TARGET="viewer">Macworld Online</A></P>
  </BODY>
</HTML>
```

Items on the Menu

Create this page and save it as Menu.frame in your Hot News Page project folder.

When the browser reads your main page, it will divide the window into two areas, and then try to fill those frames with the pages named in the **<FRAME SRC=>** tag. Menu.frame is your list of hot news links; for this example, I've listed only a single link, but you can add as many as you like. If you have a long list, you may want to turn the scroll bars in that frame back on.

3a

<P ALIGN=CENTER><A HREF="http://www.macworld.com/cgi-bin/dailyads.pl/daily/dailynews.main.shtml" TARGET="viewer">Macworld Online</A></P>

This looks like an ordinary, centered HREF tag, with the exception of the **TARGET="viewer"** parameter. When a browser hits this tag, it will look for the frame named "viewer" and attempt to open the URL in it. In order for your frames-based hot news page to work, every **HREF** in your list must include the **TARGET=** parameter pointing to your viewer frame.

ing to *http://www.espn.com/gen/bln/entry.html*.

Laugh at the World

We confess that we saved the most meaningful content for last: the entertainment page. Most of the wire services carry entertainment news—Pathfinder's Entertainment Weekly Online relies on Reuters' daily feed (*http://pathfinder.com/ew/latest*), for instance. But for a dishy pile of rock and movie star happenings served fresh daily, start with CyberSleaze at the Vibe site (*http://metaverse.com/vibe/sleaze/00latest.html*). Vibe is run by Adam Curry (of MTV fame). CyberSleaze maintains the sort of "supermarket tabloid meets *CBS Evening News*" feel that MTV News and *Entertainment Tonight* have traded in since time immemorial.

Matt Drudge maintains a site loaded with links to a cavalcade of news sources, but the best part of the Drudge Report (*http://www.lainet.com/~drudge/*) is Drudge's own gossip-filled column. The closest thing to a Hollywood insider that the Net has yet produced, Drudge dredges up rumors, facts, and embarrassing innuendo about whoever's in the news, from politicians to movie moguls, and serves it up in weekly doses, with midweek updates as events warrant. You can also have Drudge's reports delivered directly to your e-mail box. To sign up, visit the World Wide Web page.

Finally, if you haven't found enough human foibles to laugh at during your tour of the raw daily news, Chuck Shepherd's News of the Weird is a weekly syndicated column of bizarre stories compiled from news sources around the world. You can read it on the Web (*http://www.nine.org/notw*) or have it delivered to your e-mail box—see the Web page for details. The electronic version is delayed two weeks to give newspapers a chance to publish it first.

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Web Worthy

Several companies are all too eager to have you make their Web site the first stop of your daily surf. In the pursuit of your eyeballs, they let you create a customized personal page with links to resources they've culled from the Web. Once you've built your perfect page, they save your configuration, and the next time you visit their site, they automatically present your page.

Before everyone and his brother started making custom Web pages, there was **CRAYON**, or Create Your Own Newspaper (*http://www.crayon.net*), and the site is still worth a visit simply for the mind-bogglingly long list of information sources that CRAYON maintains updated links to—you'll find well over 200 local U.S. newspapers. The early days of CRAYON were low-tech: you had to save your page on your own hard drive, and the formatting left something to be desired. But today's CRAYON will save your newspaper preferences on its server, and sports a Frames-based layout with in-line images.

Netscape was one of the first major Web presences to offer customized home pages. Its **PowerStart** service (*http://www.netscape.com/custom/index.html*) is a competent if unimaginative concatenation of links to the usual high-profile news, information, search, and entertainment services. In typical style for the company that still wants to be bigger than Microsoft, Netscape's PowerStart page is littered with links to the company's site and opens with Netscape Headline News—little more than a list of links to the company's more recent press releases and marketing statements. On the upside, the PowerStart customization pages are well constructed and show you a mock-up of your page as you build it. Microsoft offers a similar program as part of the **Microsoft Network** (*http://www.msn.com*), and beats Netscape by a nose due to a presentation that's a bit more aesthetically pleasing. Don't be put off by the MSN home page—a jiggling, bouncing, panning, scanning, animated multimedia monstrosity that had me hunting for an off switch—Microsoft uses the FutureSplash plug-in from FutureWave to good advantage when it comes to navigating your custom hyperlinks.

Netscape's **In-Box Direct** program, on the other hand, is extra cool. By signing up for this free service, you can get all kinds of news and information (from sources as august as the *New York Times*) delivered directly to your e-mail box (*http://form.netscape.com/cgi-bin/forms/misc/ibd_form/html/inboxfaq.html*).

never be able to leave well enough alone, and will always be trolling for new, tighter data feeds. But that's the nature of knowledge: the more you have, the more you want—even if it never quite adds up to wisdom. **m**

Associate editor CAMERON CROTTY is an infomaniac who covers networking and the Internet for *Macworld*.

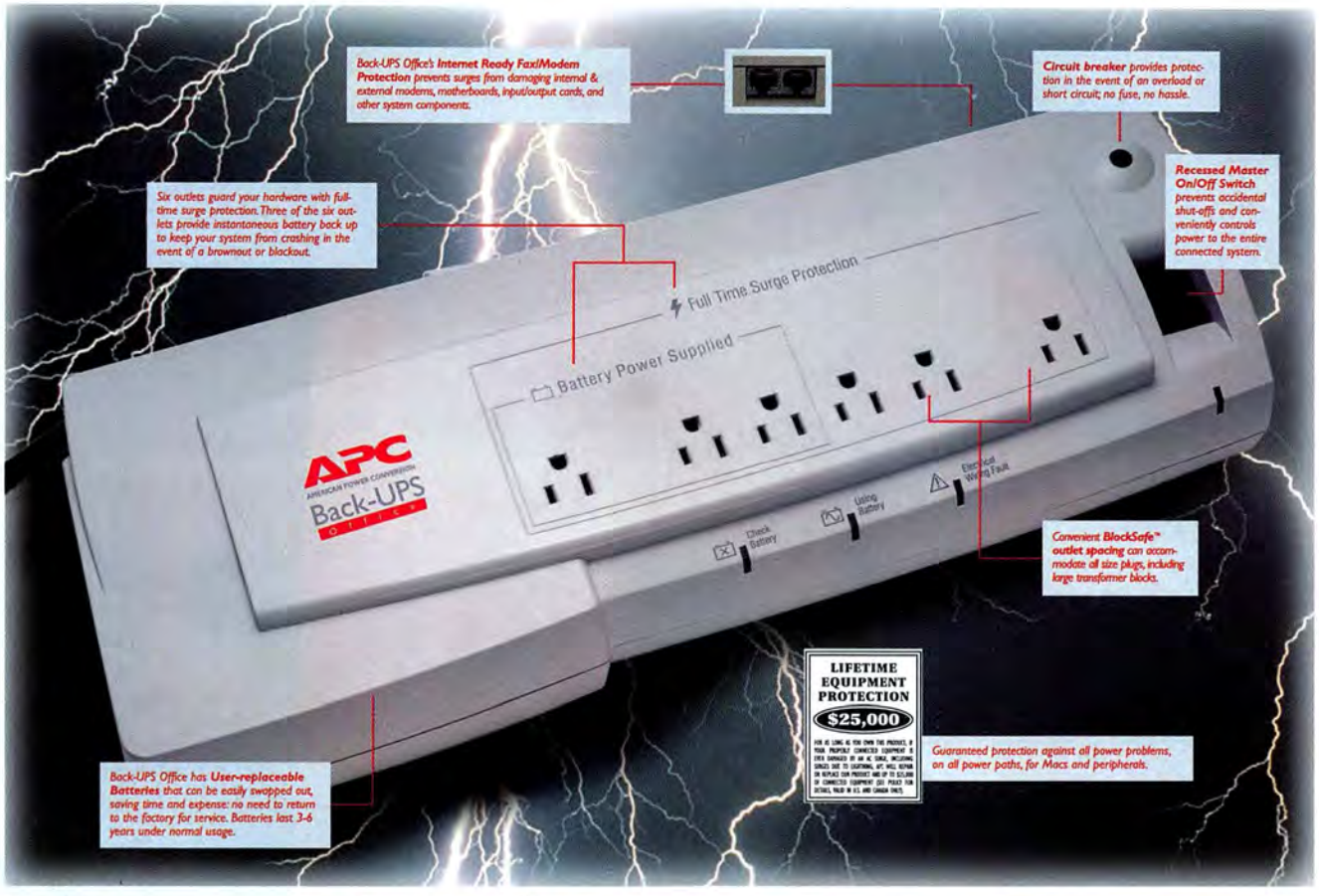
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"They thought my new Multipath Back-UPS® Office™ was just a big surge suppressor – then the lights went out."



At last, a safe place to plug everything: Multipath Back-UPS Office for Mac workstations and peripherals

Facing the darkness is hard, but inevitable: You have a better chance of winning the lottery than of escaping power problems: They're the single largest cause of computer data loss and hardware damage.

Back-UPS Office provides reliable power for your entire system. Instantaneous battery backup ensures uninterrupted operation of your CPU, monitor and an external storage device. Full-time surge suppression and site-wiring fault protection spreads a true Multipath safety net under any remaining integrated peripherals, like modems, printers, faxes and phone systems. Back-UPS Office also provides convenient BlockSafe™ outlet spacing to handle all size plugs – even large block transformers.

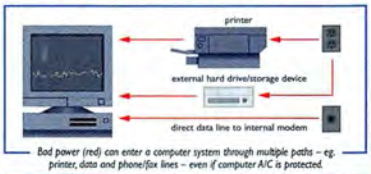
Unique Multipath protection keeps your Mac and data safe

Plugging a phone line into your computer doubles your vulnerability to power problems; add any peripheral, and it triples. Even if your AC power-line is shielded, when a surge hits an unprotected peripheral, it can blaze down serial and data lines, and toast your expensive Mac.

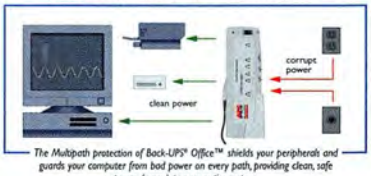


Back-UPS Office's compact design installs easily on desktop, floor or mounts to wall.

Multipath Means Total Power Protection



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The Multipath protection of Back-UPS® Office™ shields your peripherals and guards your computer from bad power on every path, providing clean, safe power (green), to your entire system.

Multiple peripherals and data lines to and from your system are vital, but dangerous. Without them, you can't do your job. However, if a power sag makes your modem drop the line while you're downloading from the Internet, or locks your keyboard before you've saved work, you lose time, money and spend another late night at the office to meet your deadline.

Back-UPS Office protects your entire system

Until now, protection for your entire system required several devices. But multi-device protection can leave you vulnerable to line noise and unwanted data glitches created by the voltage differential between outlets. Those glitches are prevented with the Back-UPS Office common voltage reference.

Back-UPS Office means true Multipath protection, clean, safe power to every peripheral, and instant battery backup to keep your cutting edge system and O/S from crashing. It means protection for less by integrating the security of a surge suppressor with the power of a UPS, guaranteed up to $25,000.

RECOMMENDED TESTCENTER 1996 ResellerNews SPRING COMDEX

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-Computer Reseller News

APC has won more awards for reliability than all other brands combined

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Data			•
Phone			•
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Number of Block Outlets			2
Protection from			
Surges	•	•	•
Spikes	•	•	•
Blackouts		•	•
Brownouts		•	•
Overvoltages			•
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Battery backup for			
PC		•	•
Monitor		•	•
Storage Devices/Zip Drives			•
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Internet or Network			•

Traditionally, protecting all your equipment meant buying a surge suppressor and a UPS. Even then, only your AC line was protected. New Back-UPS Office protects all paths to your equipment: Bulletproof Multipath protection

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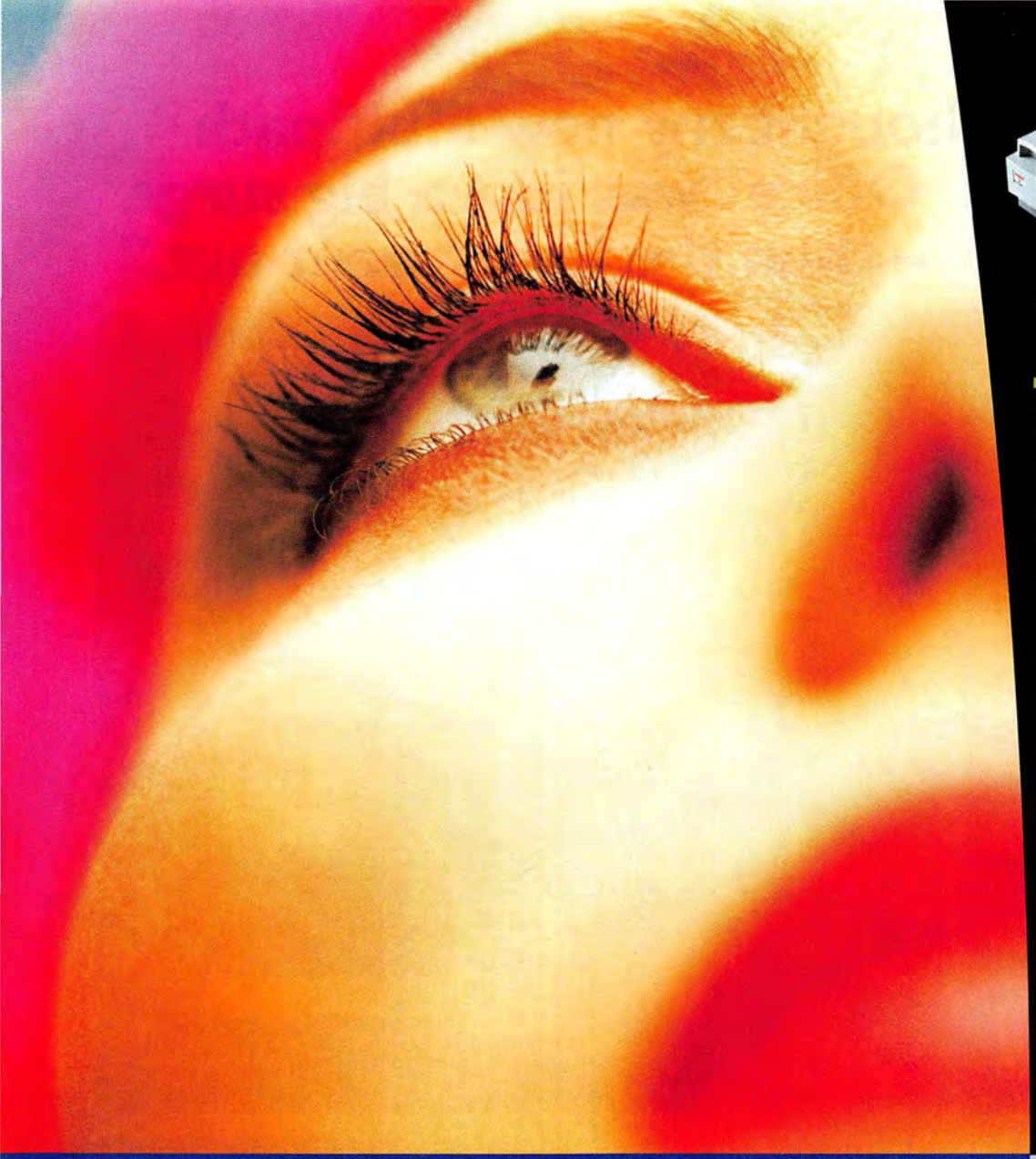
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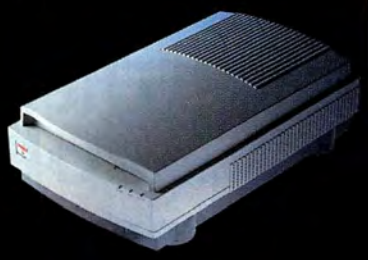
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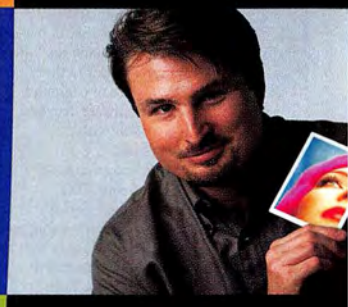


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Media

QuickTime VR Clinic, Part 2: Objects

TAKING OBJECT MOVIES OUT FOR A SPIN

by Jim Heid



A QuickTime VR panoramic movie lets you explore places; an object movie lets you examine things: grab them, turn them around, view them from above and below. Last month I looked at making panoramics. This month it's the world of object movies, and there's good news: simple object movies are easier to create than panoramics. (I'll describe what I mean by *simple* later.) A tripod-mounted camcorder, a couple of hardware store gimcracks, and free Apple utilities are all you need to create object movies suitable for Web sites, CD-ROMs, and kiosks. Visit my Web site (*http://www.heidsite.com*) for additional information and examples.

A Different Spin

When you take a QuickTime VR panoramic, you rotate the camera, snapping a picture at each stop. Object movies turn this around: the camera remains stationary, and you rotate the object for each shot. You then create a linear QuickTime movie from those shots, and convert that into a QuickTime VR object movie.

You can also create object movies from images created by 3-D programs—make an object movie of that next-generation toaster you've designed, or of a spaceship, or even of some 3-D type. Render a series of images, rotating the object the same amount between each one. Convert the images to a linear QuickTime movie, and then convert that movie into an object movie. If your 3-D program can render directly to a QuickTime movie (most can) you can simply convert that movie into an object movie.

Setting Up for the Shoot

For real objects rather than rendered ones, you'll probably want to assemble a turntable-style rig that enables you to position and rotate the object for each shot (see "An Object Platform"). You can get by without, if you're willing to eyeball the object's positioning, but the precision of a turntable yields object movies that deliver smoother navigation.

Not mechanically inclined? Consider a commercial object rig. Kaidan (215/364-1778, *http://www.kaidan.com*), whose panoramic tripod mounts I raved about last month, offers several object-movie rigs. The $399.95 Magellan QC is designed for use with Connectix's Color QuickCam ($299; 415/571-5100, *http://*

continues

LARRY GOODE

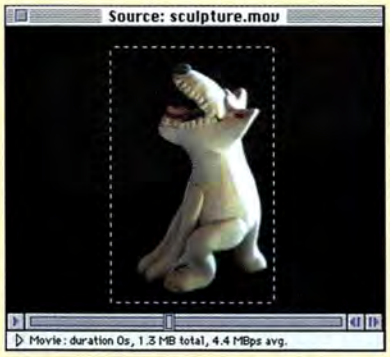
OBJECT LESSON: Making the QuickTime VR Movie

Set up an object-platform rig and you're ready to make a QuickTime VR object movie. The following instructions assume that you are using a video camera connected to a Macintosh. Adobe Premiere ($795; 408/536-6000, *http://www.adobe.com*) has a stop-motion capture feature that's ideal for object movie-making.

To use Premiere, choose Stop Motion from the File menu's Capture submenu. (Don't have Premiere? You can also use the Apple Video Player utility that accompanies the Power Mac 7500, 7600, and 8500, as well as Performas equipped with video-in features; its Copy Video Display command copies the current video signal to the Clipboard. Paste the resulting image into Apple's Movie Player utility. Repeat for each shot.)



Premiere's stop-motion mode numbers each frame.



Movie Cleaner Pro lets you crop in on the object.

SCULPTURE BY MONA ADISA BROOKS

Setting Up Place the object on the stand, arrange the background and lighting, and point and focus the video camera. Zoom in so that the object fills the frame. Before you start filming, make sure that the entire object will appear in each shot. Turn the object one full revolution while looking through the camcorder's viewfinder or at the video window on the Mac.

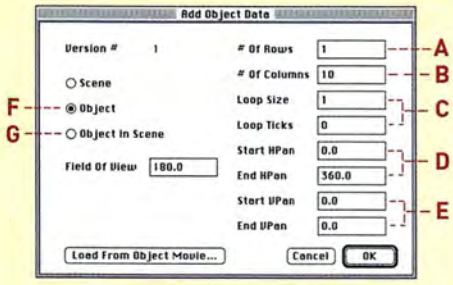
Adjust Capture Settings Adjust your capture hardware's brightness and contrast settings for the best picture. If you're using a black background, you can ensure it appears completely black by turning down the brightness and turning up the contrast a bit. But don't go overboard, lest image quality suffer. It's better to retouch the frames later if need be. Use a quarter-screen (320-by-240-pixel) capture size—you'll probably crop the resulting movie to make it smaller. As for compression, use a high-quality compressor, such as Component Video (which is built into QuickTime), for the initial capture, or even no compression. You'll compress the movie again later, so you want to start out with the highest-quality image.

Capture the Frames Snap each frame, rotating the object counterclockwise one increment between each shot. Your first shot should be of the back of the object; because of the way object movies are structured, this technique improves navigation performance. (If you're taking only ten or so shots for a small object movie, this isn't critical.) To snap a frame in Premiere's Stop Motion mode, press the spacebar or click on the Step button. Premiere shows the number of frames you've snapped above the video window. When you've finished, click on Stop. You now have a linear QuickTime movie containing each shot. Play it if you like: you'll see the object spin once.

Cropping and Compressing For smaller file size and better composition, crop the movie so that just the object appears. You can do so with Premiere's CD-ROM Movie command or Terran Interactive's Movie Cleaner Pro ($195; 408/278-9065, *http://www.terran-int.com*), shown here. Leave several pixels of space around the object. To make sure you don't cut off part of the object, step through each frame after drawing the crop area and verify that the object fits within it. For compression, Apple recommends using the Video compressor at a quality setting of 50 or 75.



Converting to an Object Movie



Creating the object movie involves processing the cropped and compressed linear QuickTime movie you just made using Apple's free Make QTVR Object utility (available from *http://qtvr.quicktime.apple.com*). Launch Make QTVR Object and open the movie you want to convert. Choose Add Object Data from the Edit menu and specify any details that differ from the default settings shown here.

A. If you took multiple sets of images, altering the camera's vertical position for each one, enter the number of sets you took here.

B. Enter the number of images you took for each horizontal increment here.

C. These options deal with an advanced object-movie technique that allows looping animations, such as blinking lights or spinning gears, within an object movie; see the Read Me file that accompanies Make QTVR Object.

D. For a 360-degree rotation, use the default values of 0 and 360. If you shot a 180-degree rotation—perhaps the back of the object just wasn't interesting—specify 180 for the End HPan.

E. If you took multiple sets of images, enter the angle of the start and end sets. For example, if you shot the first set looking directly down at the object and the last looking directly up, enter 90 and -90.

F. Gives the movie the standard object-movie user interface.

G. Gives the movie a different navigation interface that's more suitable for large objects (for example, a car) within a scene. By using different mouse-pointer shapes and dragging techniques, the object-in-scene interface provides anyone viewing the movie the illusion of walking around an object rather than grabbing and spinning it.

An Object Platform

Aside from a backdrop, lighting, and a tripod-mounted camera, your object-movie studio needs a platform to hold the object you're shooting. You can eyeball an object's position when rotating it for each shot, but for smoother, more-realistic object movies use a rotating platform.

For smallish objects—vases, small statues, toy cars, small dogs—you can use an initiative-challenged (formerly known as lazy) Susan. I used a 12-inch–diameter plastic rotating spice tray that I commandeered from my kitchen cabinet.

Larger objects will tax your spice tray. One option we've used here at *Macworld:* a bicycle wheel and an axle vise, which mounts to a table and enables the wheel to rotate horizontally.

Calibrate the edges of the platform, and put a mark on the floor nearby to help you rotate the platform the same distance for each shot. You can use a flexible tape measure to measure the platform's diameter, and then draw tick marks at regular intervals. Or you might use a compass and protractor, measuring from the center of the platform out to its edges. What's important is that you have evenly spaced tick marks whose positions correspond to the degree of rotation you plan for each shot.

A vertical extension lets you shoot the object from below; that is important if you're shooting multiple sets of images. It doesn't have to be fancy: I used a paper-towel tube covered with black construction paper. For accurate rotation, be sure the extension is centered on the platform.



www.connectix.com) and for objects up to 8 inches across and less than 7 pounds. The $1999.95 Magellan 1000 handles objects up to 36 inches across and up to 100 pounds; it holds cameras up to 5 pounds.

Speaking of cameras, a video camera and a Mac with video-capture hardware work best, letting you preview each shot and adjust brightness, color balance, and other settings. Digital cameras such as an Apple QuickTake 150 or Kodak DC-40 will work, but their fixed-focus lenses can't capture sharp images of objects closer than 4 feet. You can, of course, use any photographic camera and then scan the photos, but the camcorder route is fast and convenient.

Apple also recommends photographing an object against a black background: this "gives the feeling that the user is picking up and manipulating the object, rather than just walking around it," to quote the QuickTime VR Authoring Tools documentation. A jet-black background does yield a dramatic object movie, but might not be practical for all objects and isn't exactly lively. If you want some color, try to keep the background a consistently lit, solid color. This helps the movie compress efficiently, which keeps its size down.

Whatever background you use, it's vital that it remain the same for each shot—if you accidentally get your hand in one shot or crease a piece of photographic background paper, the object-movie illusion will vanish. But if you can't control the background—maybe you're shooting the old Chevelle in a parking lot—just shoot away and retouch your shots in Adobe Photoshop.

How Many Shots to Take?

At the outset, I said you can examine a QuickTime VR object from above and from below. It's time to qualify that—and describe what I mean by a *simple* object movie. An object movie allows this illusion only if you shoot multiple sets of images, changing the camera's *vertical* position between each set.

Shooting multiple image sets is a bear. Camera positioning and the degree of rotation for each shot are critical. And the movie balloons to several megabytes—too big for Web use. For the Web, take only one set of images. To give the object more of a 3-D appearance, position the camera slightly above the object.

For a Web object movie, take between 8 and 12 shots. Depending on frame size, that translates to a file in the 100K ballpark. If file size is no object, take 36—the more shots you have, the smaller the degree of movement between each shot, and the more smoothly the object will appear to turn. The number of shots may also be influenced by the dimensions of your movie. If a small frame size is acceptable, you can include more shots. For Web sites, you might post low- and high-bandwidth versions.

TWEAKS AND TIPS

Setting the Poster View To make a particular view of the object visible when the movie opens, navigate to that view and choose Set Poster View from the Edit menu.

Creating a Low-Bandwidth Version If you want to create a smaller, faster-downloading version, scale down the original linear movie using Premiere, Movie Cleaner Pro, or any video editor with scaling features. Perform this step at the same time as you crop and compress.

Making a Cross-Platform Movie To make an object movie that plays under Windows, open the finished movie in Apple's Movie Player, choose Save As, and check the Playable on non-Apple Computers box.

Objects of the Future

The next version of QuickTime VR, 2.0, will add enhancements to object movies. You'll be able to pan across them and zoom in and out on objects—much as you can with panoramics now. In 2.0, object movies will also support *hot spots*, which enable users to branch to a different movie or to a Web page by clicking on an area within the object movie.

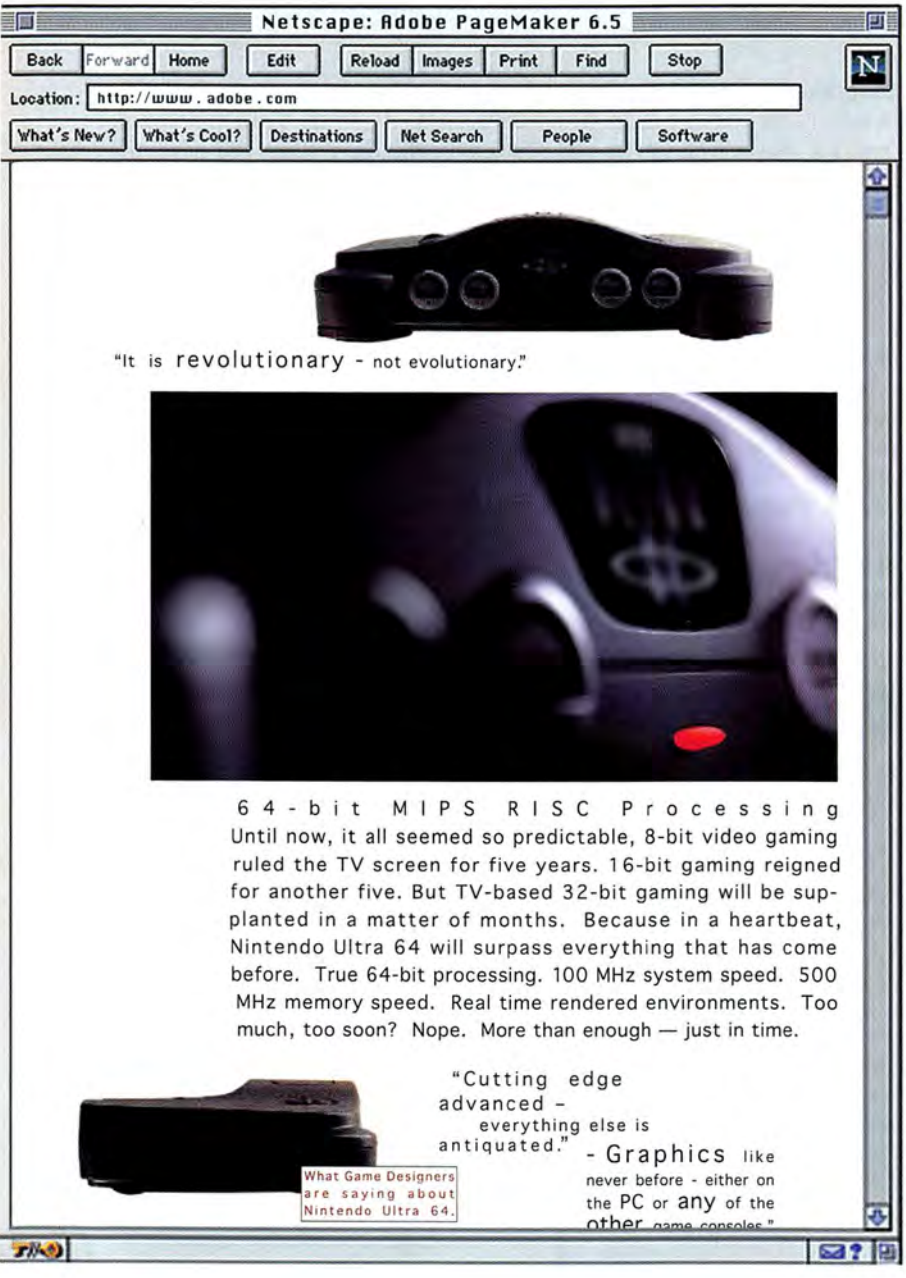
For Web work, there's an object movie–like technology that doesn't use QuickTime at all. NetVR's (206/702-9525, *http://www.netvr.com*) $59.95 Turnado technology relies on a Java applet to provide object movie–like features. Because it relies on Java, it works with Netscape Navigator 3.0 and Microsoft Internet Explorer 3.0. Unlike QuickTime VR, however, Turnado doesn't support panning, zooming, or hot spots. While other companies nip at its heels, Apple's technology remains a step ahead. **m**

Next month: MIDI and media

JIM HEID's latest book, a collection of tips for Web developers, will be published in January 1997 by IDG Books Worldwide.

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Design and art direction for the Nintendo Co., Ltd. 1995 annual report by Leimer Cross Design, Seattle. Photography by Tyler Boley.

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Publishing Workshop

Easy Wins with Search and Replace

by Steve Roth

If there's one thing I love (in my work, at least), it's easy wins—tips and tricks to solve common problems without a lot of time and effort. And if there's one place where easy wins are rampant, it's the area of search and replace. (In the parlance of most Mac programs, that's Find and Change.)

Using search and replace features in Microsoft Word, Adobe PageMaker, QuarkXPress, and other programs, you can save yourself many hours of repetitive, excruciating drudge work. There are just a few keys to really taking advantage of these tools.

• Look for Patterns Watch for consistent, unique patterns of text or formatting. If you can find them, you can change them.

• Make Friends with Metacharacters Metacharacters are codes you can enter in the Find and Change fields that represent invisible characters or combinations of characters. The metacharacter in Word for a carriage return, for instance, is ^p.

• Don't Forget Formatting You can find and change formatting in most programs—search for underline and make it bold, for instance. There's often a formatting pattern to search for when there are no unique text char-

Three Find and Change Techniques

1 Killing Hard Line Endings

Don't you hate text files that have a hard return at the end of every line—like e-mail files? Lines don't wrap, so they don't lay out very well. Usually there are consistent unique characters between paragraphs: often two hard returns, sometimes a hard return followed by one or more spaces. You can fix these in a jiffy.

A. If you're tired of files that look like this . . .

On the Mac, a carriage return consists of one character: a carriage return (ASCI character number 13).

On Wintel boxes, a carriage return is actually two characters: a carriage return and a line feed (ASCII 13 and 10). The line feed shows up as

. . . use these two routines.

Find What	Replace With
^p^p	!@#

Find What	Replace With
^p	<space>

The first routine replaces paragraph ends with a unique set of characters. You might need to use ^p <space> in the Find What field. !@# isn't invective; it's handy because it's shift-123. The second routine replaces remaining hard returns with spaces, and merges the whole document into one enormous paragraph.

B. The interim text looks like this . . .

On the Mac, a carriage return consists of one character: a carriage return (ASCI character number 13). !@#On Wintel boxes, a carriage return is actually two characters: a carriage return and a line feed (ASCII 13 and 10). The line feed shows up as a little box. To get rid of them, search for line feeds and replace with nothing.

. . . run two more searches.

Find What	Replace With
!@#	^p

Find What	Replace With
<space><space>	<space>

The next search replaces your unique code with a hard return (restoring the intended paragraph breaks). The last search removes any extra spaces where lines joined. You may need to run this one a few times.

C. You end up with this . . .

On the Mac, a carriage return consists of one character: a carriage return (ASCI character number 13).

On Wintel boxes, a carriage return is actually two characters--a carriage return and a line feed (ASCII 13 and 10). The line feed shows up as a little box. To get rid of them, search for line feeds and replace with nothing.

2 Automating Run-in Heads

You use style sheets, of course, to format the different types of heads in your documents automatically. But what about a run-in head—a head that is part of another paragraph? Few Mac programs have character-level style sheets, so lots of people end up swiping and formatting their way through their documents.

Just say no. There are (at least) two ways to automate run-in heads with search and replace—one using styles, and the other using . . . well . . . *styles*. Both techniques point out another thing about search and replace: you can prepare files with future replace routines in mind, thus automating your whole workflow.

Run-ins Using Type Styles The simple approach is to use some kind of unique type style, like underline or outline, to identify the run-in heads. The key is choosing a type style that you use only for run-in heads and that you can apply with a keystroke. (In Word, don't hesitate to explore the Commands dialog box, where you can assign keyboard shortcuts to Green, or Outline, or whatever.)

I reserve underlining for run-in heads in my documents. Then I can search for underlined text and replace the underlining with the formatting I prefer.

Run-ins Using Paragraph Styles I love using Word's Heading 1, Heading 2, and Heading 3 styles because they let me see my document in outline format. But what if I want the Heading 3 para-

acters to give you a leg up. And you can apply formatting to anything you have managed to find.

With those three rules in mind, here's a lineup of some of my favorite search-and-replace routines—ones that I use daily or weekly. These examples all use Microsoft Word 5.X, but you can apply the same techniques in Word 6.X, PageMaker, QuarkXPress, or any other search-and-replace tool. You just need to adjust things slightly for those programs' ways of doing business.

If you need to run a replace routine multiple times, press ⌘-Y for Word's do-it-again command. (⌘-option-A is find it again—great for those semiautomated situations where human judgment is required in each instance.) When I'm doing this type of work, I always turn on invisible characters (Show ¶ command in Word 5.X), so I can see what's in the file.

The routines described here are just the tip of the iceberg. When you start using search and replace creatively, you quickly discover how much of your life you've been wasting. And when you combine various programs' Find and Change features with other automation tools—like QuicKeys, AppleScript, and WordBasic—it doesn't take long to get to that place we're all really trying to get to: the beach. **m**

Contributing editor STEVE ROTH is president of Thunder Lizard Productions in Seattle (*http://www.thunderlizard.com*).

Making Metacharacters Your Friends

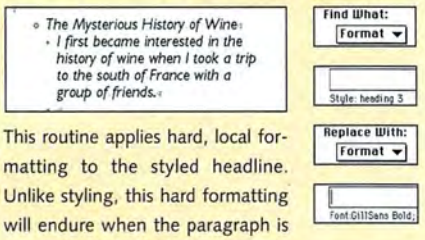
Almost all the really good search-and-replace routines use ***metacharacters***—codes you can enter to represent special characters or strings of characters. This table includes the most common metacharacters. Each program has others, depending on its feature set. In PageMaker, check out the Shortcuts section of online help. In Word, go to Finding and Replacing Text in online help. QuarkXPress lists metacharacters in the Find/Change section of online help. If your document has some strange character whose metacharacter you don't know, you can simply copy and paste it into the Find/Change dialog box (in Word, PageMaker, and QuarkXPress, at least.)

Character	Word	PageMaker	QuarkXPress
Hard return	^p	^p	\p
Line break	^n	^n	\n
Tab	^t	^t	\t
Page break	^d		
Nonbreaking space	^s	^s	
Discretionary hyphen	^-	^-	
Wild card (any character)*	?	^?	\?
Any digit	^#		
Contents of Clipboard	^c**		
Any string of white space*	^w	^w	

** Only in the Find What field. ** Only in the Replace With field.*

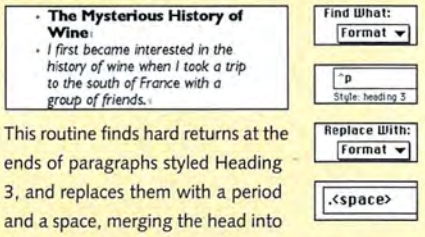
graphs to run in? Once I'm done writing and editing, I use the following routines.

Add hard formatting to text in heading style.



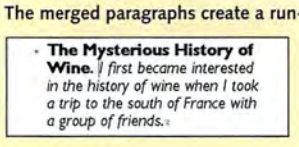
This routine applies hard, local formatting to the styled headline. Unlike styling, this hard formatting will endure when the paragraph is merged with the following one.

Remove returns from paragraphs styled as heads.



This routine finds hard returns at the ends of paragraphs styled Heading 3, and replaces them with a period and a space, merging the head into the next paragraph.

The merged paragraphs create a run-in head.



3 Converting Multiple Spaces to Tabs

How about those files your writers and editors give you that use multiple spaces to line up table columns? As you know, these columns don't line up when you use a proportionally spaced font. You really want to insert tab characters between columns, and set tab stops appropriately; here's how to do it easily.

Spaces work fine for aligning columns with a monospaced font such as Courier.

```
 740   1178   12   1/10   1983 Corton Charlemagne (Latour)
1450   1179   24   1/10   1983 Corton Charlemagne (Latour)
 500   1180    1   BT     1986 Montrachet (Ramonet)
2000   1184    6   BT     1988 Montrachet (Ramonet)
```

When you shift to a proportional font such as Gill Sans, however, everything goes wonky.

740 1178 12 1/10 1983 Corton Charlemagne (Latour)
1450 1179 24 1/10 1983 Corton Charlemagne (Latour)
500 1180 1 BT 1986 Montrachet (Ramonet)
2000 1184 6 BT 1988 Montrachet (Ramonet)

Use search and replace to change multiple spaces to single tabs.

Find What	Replace With
<space><space>	^t
^t^t	^t
^t<space>	^t

This routine replaces double spaces with tabs. (Note: this routine assumes at least two spaces in each forced alignment.)

And this one replaces double tabs with single tabs. Run it repeatedly until there are no more double tabs.

This one gets rid of the few extra spaces remaining.

Finally, set your ruler tab stops so the columns line up properly.

740 1178 12 1/10 1983 Corton Charlemagne (Latour)
1450 1179 24 1/10 1983 Corton Charlemagne (Latour)
500 1180 1 BT 1986 Montrachet (Ramonet)
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Graphics Workshop

Using Masks and Floaters to Composite in Painter

by Cathy Abes

ARTIST San Francisco artist Steve Campbell has created digital art for numerous clients, including Apple, Xerox, and Oracle. His work has also appeared in several books, including the *Fractal Design Painter Wow Book* (PeachPit Press, 1996).

HOW IT WAS DONE When you think of compositing, you naturally think of Adobe Photoshop—even if you work primarily in another application. But for Campbell, whose tool of choice is Fractal Design Painter, that involves too much switching back and forth between programs. And although it's more challenging, compositing within Painter also offers painterly effects he can't achieve in Photoshop.

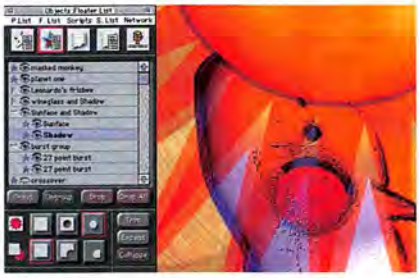
The trickiest problem in compositing a Painter file is managing the relationship between floaters, floater masks, and canvas masks. For example, if you don't use the right combination of canvas mask and floater mask settings, you can mask out the wrong parts of a floater or make the wrong areas visible. To minimize such conflicts, Campbell dropped all floaters relating to one area of the image before moving on to another area.

Two of the elements involving floaters and masks were the chimera and the sun face. To build the face, he used Detailer, Fractal's new 3-D painting program, in conjunction with Painter.

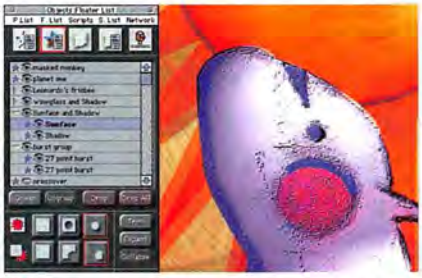
TOOLS **Hardware:** Power Mac 8500 with 49MB of RAM and 2GB internal hard drive; FWB Hammer 4GB external hard drive; AppleColor 14-inch monitor; Agfa StudioScan 300-dpi color scanner; Fujitsu 230M external MO drive; Hitachi MultiPad pressure-sensitive graphics tablet. **Software:** Fractal Design Painter 4.0.3; Fractal Design Detailer 1.0; Adobe Illustrator 5.5. **m**



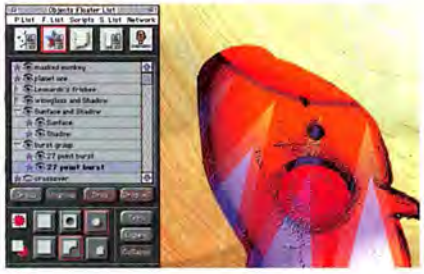
1 To create the sun face, Campbell merged images of eyes and a doll's face, saved that as a floater, then dropped it onto a sphere in Detailer using the Implicit mapping type; rendering the object generated a mask he could use in Painter.



2 Before setting the interaction between those floaters and the canvas masks (the background frame mask and the clown masks), he positioned the four sun floaters: the sun face, its drop shadow, and two star-burst shapes that were imported from Illustrator.



3 To produce the desired effect—to have the sun appear only outside the clown masks—Campbell turned on the background frame mask and set it to Positive, and the clown masks above it to Negative (in the Path list), and set the floaters to Mask Inside.



4 In contrast, turning off the background frame mask and setting the clown masks to Positive inverts the masking effect, and therefore the floaters' interaction with the canvas masks. These settings produce the wrong effect: making the sun visible only where it overlaps the clown masks—inside the masks.





5 After placing the chimera floater, he set the floater to Mask Inside (to remove its original background), then duplicated the chimera. Because the floater didn't overlap any active canvas masks, he left the interaction with the canvas masks disabled.



6 With the bottom chimera floater hidden, Campbell began painting into the top chimera floater mask with a customized masking brush to erase the lower half of the dark chimera, which would allow the bottom floater to show through once it was turned on.



7 Once the painting process was finished, he made both floaters visible, compositing them so that the chimera appears to change color as it passes through a beam of light.

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Printers	◯	3	◯
Storage Devices	◯	4	◯
Networking/Data Communications	◯	5	◯
Internet/Intranet products/services	◯	6	◯
Software: business/productivity	◯	7	◯
graphics/design	◯	8	◯
interactive publishing/ multimedia	◯	9	◯
entertainment	◯	10	◯
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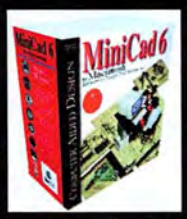
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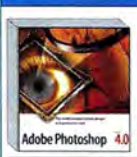
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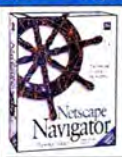
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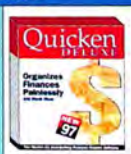
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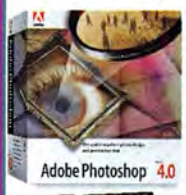
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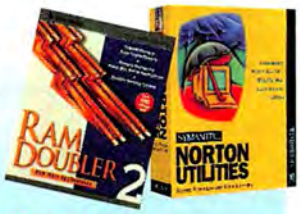
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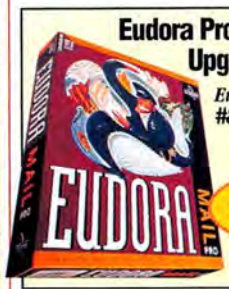
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- Motorola® – manufacturer of the PowerPC processor – No one knows it better
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- *M•Power* has the backing of APS' award-winning service and support

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- Best mix of advanced processor technology and high-quality hardware
- Compared with other personal computers running Mac OS, APS' *M•Power* gives you the most for your money

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- Get all of the hardware you want, and have it custom assembled by APS' knowledgeable staff

APS *M•Power* 603e160™

$1399*

- 160MHz Motorola PowerPC 603e processor
- 16MB of RAM
- Three available PCI slots and one available 3.5" drive bay
- 1.2GB hard drive • 10X CD-ROM

The APS *M•Power* 603e160 is the new benchmark in PowerPC, Mac OS computing. Priced at under $1400, this is the absolute value leader in RISC-based workstations. This perfect home or mass application PowerPC computer includes a 1.2GB hard disk drive, a 10X CD-ROM, and 16MB (upgradable to 160MB) of RAM. The APS *M•Power* 603e160 also includes a mouse and extended ADB keyboard, three PCI expansion card slots, and one available 3.5" low profile drive bay. One-year limited warranty.



*Monitors are not included.

603e160

- 2-5.25" Half Height Internal Bays
- 2-3.5" Low Profile Internal Bays
- 3-PCI Expansion Card Slots

INTERFACES

- Printer Port
- Modem Port
- ADB Port
- SVGA Monitor Port
- Supports 14", 15", 17" & 21" Monitors
- SCSI Port
- 16-bit Sound Output Port
- Rear Headphone Jack
- Microphone Jack

INCLUDES:

- 10X CD-ROM
- 16MB RAM
- 1.2GB HD
- Floppy Drive
- 1MB VRAM
- ADB Keyboard & Mouse
- One-Year Limited Warranty
- Desktop Case

COMPARISON

	5.25" Intl. Bays	3.5" Intl. Bays	PCI Expansion Slots	Printer Port	Modem Port	ADB Port	ADB Keyboard	ADB Mouse	PS/2 Port	SVGA Monitor Port	Supports 14", 15", 17 & 21"	SCSI Bus	IDE Bus	16-bit Sound Output Port	Rear Headphone Jack	Microphone Jack	CD ROM	Hard Drive (GB)	RAM	L2 Cache	VRAM (MB)	Floppy Drive	Price
APS 604e200 Tower System	3	5	5	✓	✓	✓	✓	✓	✓	✓	✓	1	✓	✓	✓	✓	10X	2.5	24	512K	2	✓	$2599
POWERTOWER 200e Tower System	3	2	3	✓	✓	✓	✓	✓	-	✓	✓	1	-	✓	✓	✓	8X	2	16	1MB	2	✓	$3595
PowerMac 9500/200 Tower System	1	3	6	✓	✓	✓	-	✓	-	✓	✓	2	-	✓	✓	✓	8X	2	32	256K	2	✓	$4199

Comparison information for Power Computing taken from http://www.powercc.com
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- High-performance mini-tower PowerPC system at an exceptional price
- Blazing fast 200MHz PowerPC 604e processor
- 2.5GB hard drive • 10X CD-ROM • 24MB of RAM
- Five PCI slots and five available drive bays

Blinding speed and exceptional value set this high-performance PowerPC, Mac OS workstation firmly at the top of the heap. The APS *M•POWER* 604e200 comes equipped with a gigantic 2.5GB hard disk drive, a 10X CD-ROM drive, and 24MB of RAM (upgradable to 160MB of EDO DIMM RAM) – and that's just for starters! Turbocharged with 2MB of VRAM and 512K of Level 2 cache, the APS *M•POWER* 604e200 includes five PCI slots for video, networking, peripheral expansion and other PCI-based cards. The roomy mini-tower design includes five available drive bays for optimal customization of the high-end *M•POWER* 604e200. One-year limited warranty.



*Monitors are not included.

604e200

- 3-5.25" Half Height Internal Bays
- 5-3.5" Low Profile Internal Bays
- 5-PCI Expansion Slots

INTERFACES

- Printer Port
- Modem Port
- ADB Port
- Supports 14", 15", 17" & 21" Monitors
- SVGA Monitor Port
- SCSI Port
- 16-bit Sound Output Port
- Rear Headphone Jack
- Microphone Jack

INCLUDES:

- 10X CD-ROM
- 24MB RAM
- 2.5GB HD
- Floppy Drive
- 2MB VRAM
- 512K L2 Cache
- ADB Keyboard & Mouse
- One-Year Limited Warranty
- Mini-Tower Case

APS *M•POWER* 603e200™ $1599*



- The ideal mix of performance and value
- 200MHz Motorola PowerPC 603e processor
- 16MB of RAM • 1.2GB hard drive
- 10X CD-ROM
- Three available PCI slots and one available 3.5" drive bay

*Monitors are not included.

Outstanding performance at a terrific price, the APS *M•POWER* 603e200 is the bang-for-the-buck system of choice for individual and institutional users alike. Powered by Motorola's 200MHz PowerPC 603e processor, the APS *M•POWER* 603e200 comes ready for action with a 1.2GB hard drive, and 10X CD-ROM. Run most applications in the installed 16MB of system RAM (upgradable to 160MB) and enjoy the exceptional performance afforded by the 256KB of Level 2 cache and 1MB of VRAM. Three PCI slots and one available 3.5" low profile drive bay lets you add a whole range of PCI card and peripheral options. With the included mouse and extended ADB keyboard, this is the value-priced performance system of choice. One-year limited warranty.

603e200

- 2-5.25" Half Height Internal Bays
- 2-3.5" Low Profile Internal Bays
- 3-PCI Expansion Slots

INTERFACES

- Printer Port
- Modem Port
- ADB Port
- SVGA Monitor Port
- Supports 14", 15", 17" & 21" Monitors
- SCSI Port
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INCLUDES:

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8X CD-ROM (SCSI)	179.95	____.____	MS 4300 HD (SCSI)	999.95	____.____	**ETHERNET PCI Cards**		
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CD Changer (SCSI)	499.95	____.____	15" Monitor	$299.95	____.____	**GRAPHIC Cards**		
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Jaz (SCSI)	399.95	____.____	20" Monitor	1299.95	____.____	Matrox Millennium 8MB	499.95	____.____
M540 (SCSI)	249.95	____.____	**MEMORY**			**EXTERNAL Modem**		
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8X

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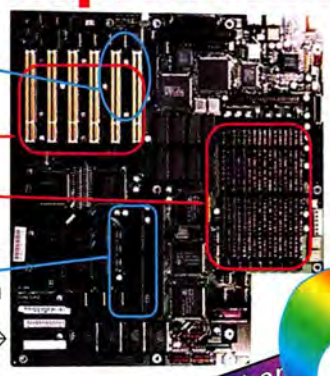
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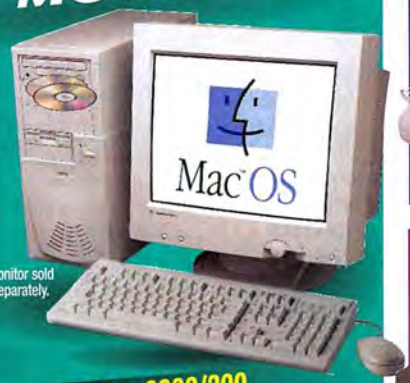
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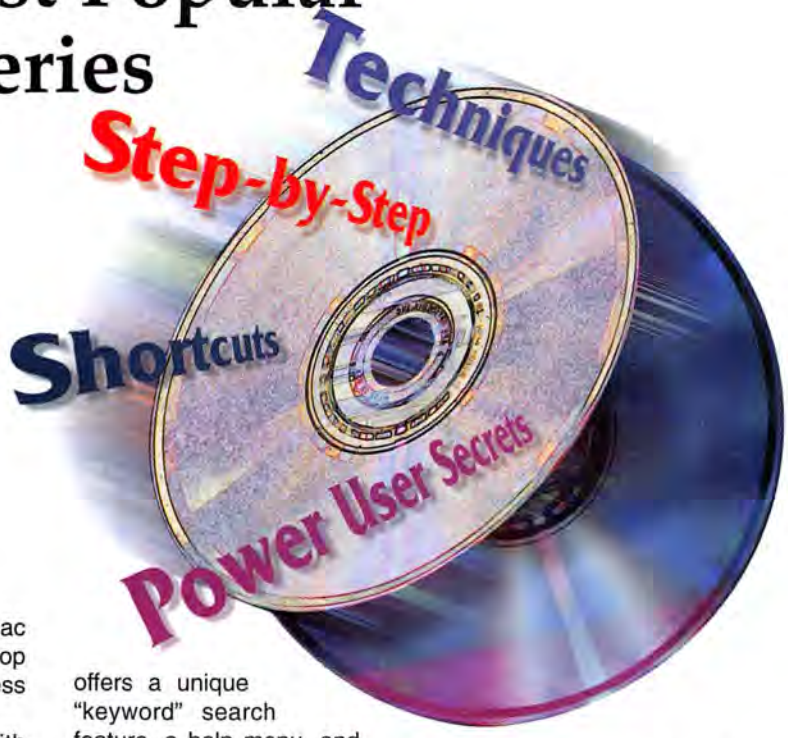
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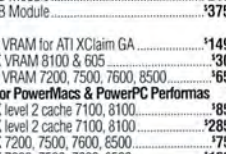
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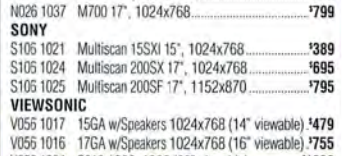
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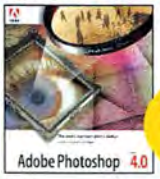
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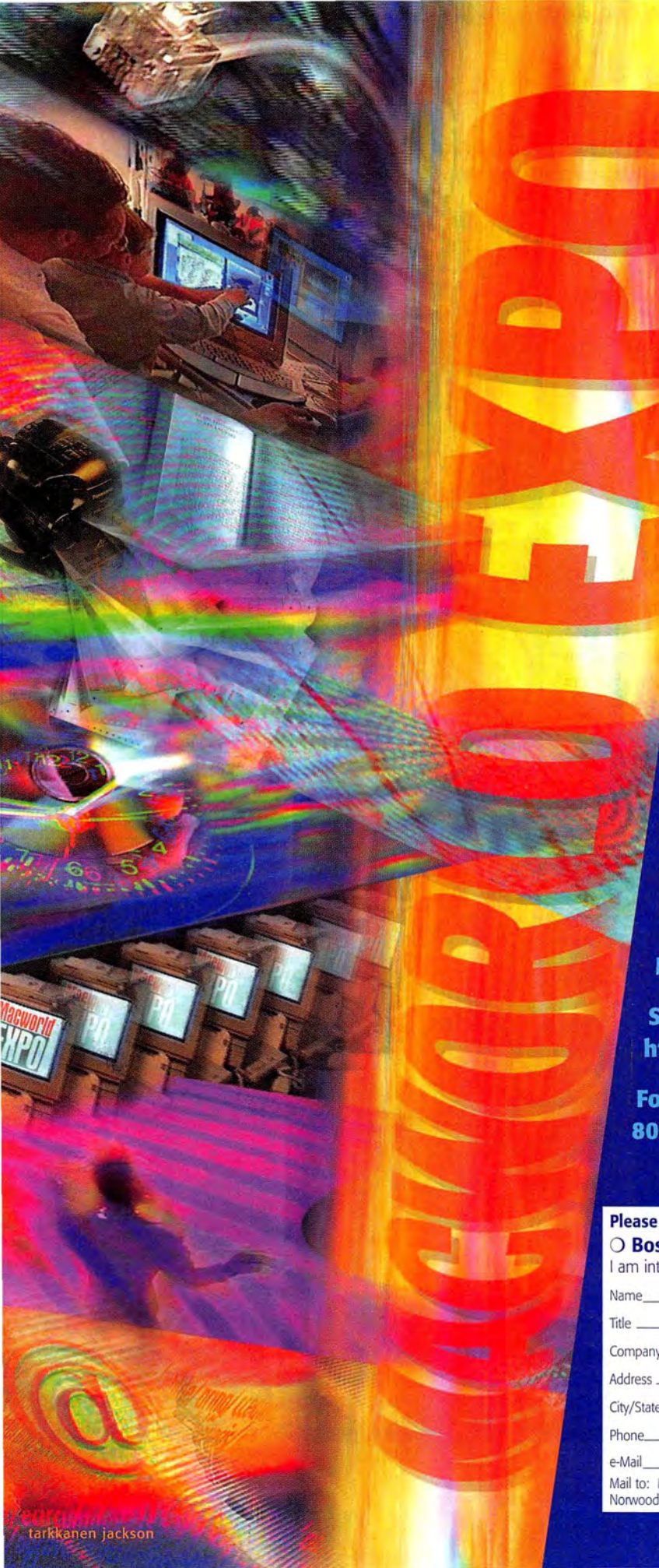
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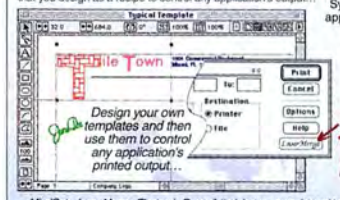
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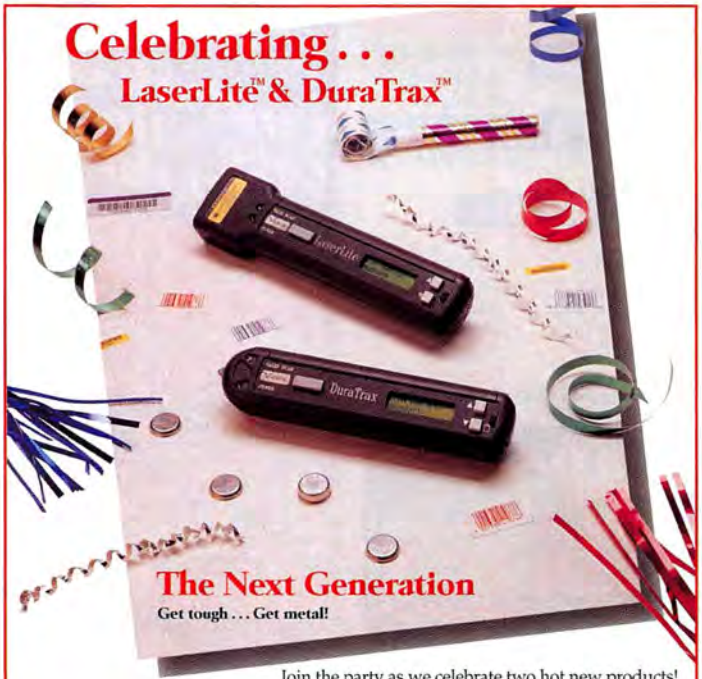
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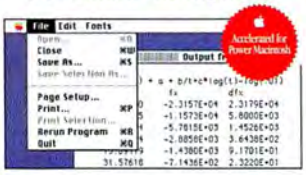
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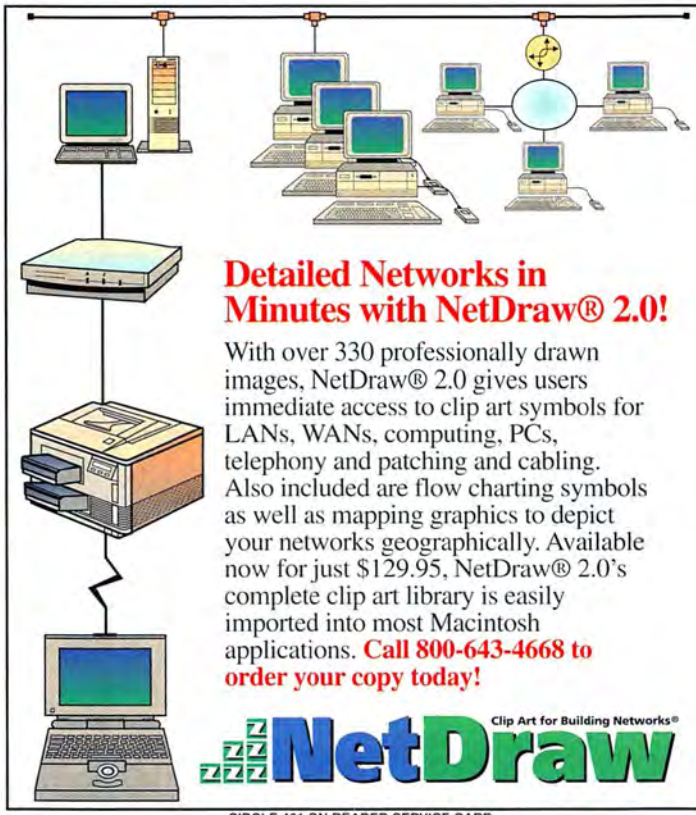
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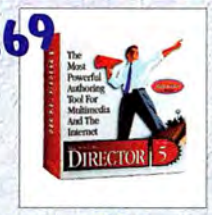


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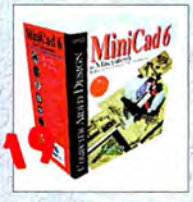
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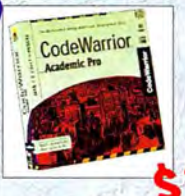
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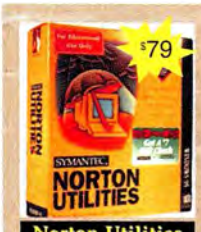
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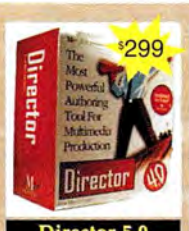
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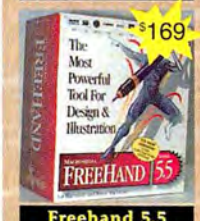
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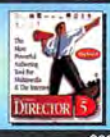
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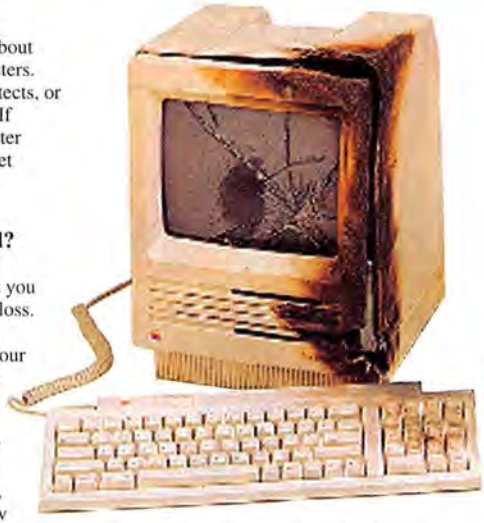
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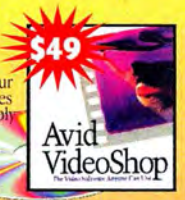
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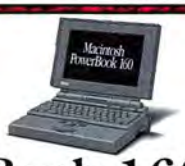
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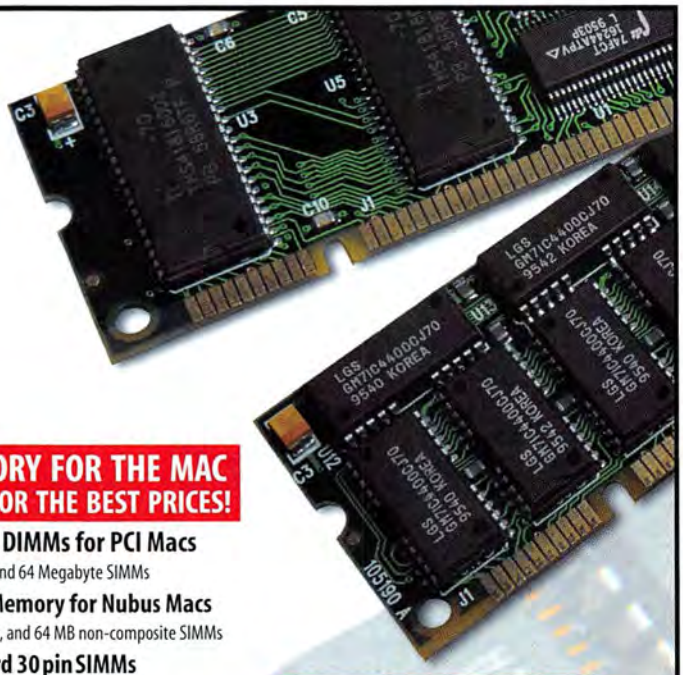
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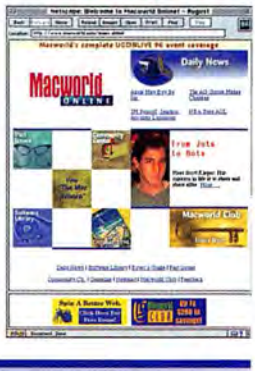
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continued from page 278

ten QuicKeys macro in the wrong context.

MLPH *n.* [Microsoft launches per hour] These days, Mac model numbers don't reflect relative speeds (a 7600 is faster than an 8100). And speed isn't consistent from chip to chip (a 150MHz Power Mac is faster than a 200MHz Performa). Therefore, we desperately need a standard computer-speed measurement for Macs, and for Windows machines, too. Counting the number of times per hour you can launch Microsoft Word 6 is the perfect real-world benchmark. *"My PowerBook 2900 has a 300MHz 605 processor." "So?" "It goes 5 MLPH." "Wow!"*

noware (nō' war), *n.* Expensive software that, after careful scrutiny of the ads and reviews, you purchased, installed, tried out once, and never used again. *Syn.:* **shelfware; onceware.**

permometer (pər mäm' mə tər), *n.* A progress bar that hasn't advanced in several minutes, leaving you wondering whether the Mac has frozen or is just taking a while.

Pogue's Law (pōgz lò), *n.* The irrefutable principle that in two years, computers will have twice the RAM, twice the speed, and twice the features of the machine you bought today—but Microsoft applications will require four times the horsepower.

powernoia (paù ər nòi' ə), *n.* The panic induced by the discovery that your hotel room has only two-prong electrical outlets, making your three-prong PowerBook power cord useless, and that you'll therefore have to finish your 300-slide PowerPoint presentation on the 28 minutes' worth of juice remaining in your battery.

prongles (pròŋ' gəlz), *pl. n.* The little flip-up cord-wrap doodads on a PowerBook Duo power adapter.

RIBs (ribz), *pl. n.* [RAM increase boards] The world needs a generic word for these things; it's way too tedious to call them "SIMMs-or-DIMMs-depending-on-your-Mac-model-or-a-RAM-upgrade-card-if-you-have-a-PowerBook." Besides, they actually look kind of like ribs when you've installed several of them.

SCAMS (skamz), *n.* [sudden computer abandonment murder syndrome] The blinding killer's rage of a Mac owner whose model, purchased only 16 days ago, is superseded by a newer model that's twice as fast and costs half as much.

sellophane (se' lə fān), *n.* The plastic wrap on newsstand issues of computer magazines that says, "Free CD-ROM inside!"

techonomics (te kə nä' miks), *n.* The study of the bizarre market forces that, despite continual advances in technology, keep all Macs, from the 128K to the latest superpowered multimedia machines, at an unchanging average price of $2495.

technostalgia (tek nä stal' jə), *n.* Wistful longing for simpler, more reliable hardware and software. *"He says his SE/30 used to go for months without crashing. What technostalgia!"*

thumbscum (thəm' skəm), *n.* The greasy, fuzzy clumps of gunk that accumulate on the rollers inside the mouse ball or PowerBook trackball cavity.

TIMP (timp), *n.* [teenage instant multimillionaire programmer] *Syn.:* **ISBUT** (Internet start-up billionaire under 20); **Marc Andreesen; the Yahoo guys.**

usery (yü' zər ē), *n.* Charging a fee for technical phone help. *Syn.:* **greed; avarice; Symantec.**

Webster (web' stər), *n.* A lover of Internet terminology. **m**

DAVID POGUE (dā' vəd pōg') cowrote the new fourth edition of *Macworld Mac Secrets* (IDG Books Worldwide, 1997) using as little jargon as possible.

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The Desktop Critic

by David Pogue

The Computer Terminology Crisis

WE DON'T NEED MORE TERMS—JUST BETTER ONES

SO MANY PEOPLE FEAR computers because they're intimidated by the terminology. Half our lingo is composed of pretentious TLAs (three-letter acronyms)—and you're still in the dark even after you know what they stand for. What's ATM? Asynchronous transfer mode? Oh, that explains it. How about TCP? Transmission Control Protocol? Terrific. Thanks loads.

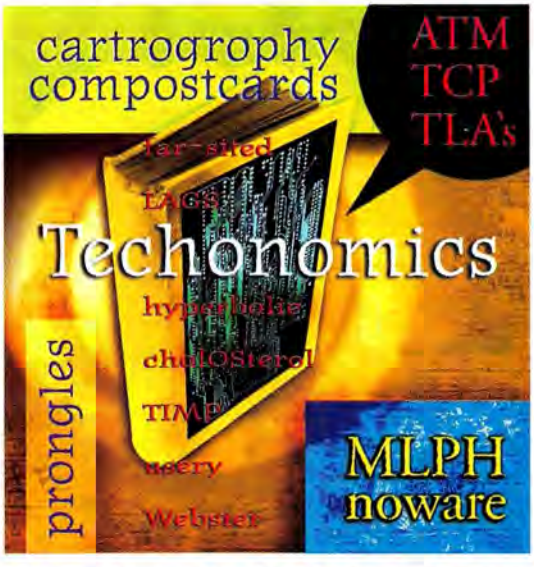
Worse, some computerese doesn't even mean what it says. Turns out newsgroups have nothing to do with news, hard copy is printed on flimsy paper, and floppy disks are hard and square. This is user-friendly?!

Actually, the problem isn't that there's too *much* terminology—it's that there's not enough *fun* terminology. On the Web you can read something called the Jargon File (*http://www.ccil.org/jargon*) that lists some of the delicious slang programmers have coined over the years. They've come up with *perfory* for those thin strips of perforated paper you tear off the edges of ImageWriter printouts; *spod* for a total online loser; and *derfing*, exploiting an unattended computer that's still online. If only more computer words were as colorful! Who wouldn't love a hobby where you could say things like, "That derfing spod should have perfory shoved down his throat"?

That America's hackers are having to coin new words highlights another problem: for many important concepts, no term exists at all. Sure, we've got *shutter* for the metal part of a disk and *ADB* for the keyboard jack (isn't *that* helpful), but what do you call the little prongs on a PowerBook AC adapter? We've got *upgrade* when you buy a newer, better version, and *downgrade* when you retreat to an older, worse version—but what do you call it when Microsoft creates a *newer, worse* version?

Allow me to tackle this growing linguistic problem with a few lexicographic proposals of my own. Please make an effort to weave these new terms into your e-mail and dinner conversation; if enough of us do so, maybe a few of these words will actually slip into dictionary-authorized existence. (In the interests of global harmony, universal love, and the betterment of humankind, I herewith relinquish all royalties.)

cartrography (kär träg' rə fē), *n.* 1. Helpless incapacitation caused by an inability to locate a specific file that's somewhere on one of 168 SyQuest, Zip, and Jaz cartridges.



2. A suicidal seizure brought on by the discovery, on arriving at a service bureau for an important printing job at deadline, that the bureau's SyQuest drive can't read your SyQuest cartridge type.

cholOSterol (kəl ō ess' tər ōl), *n.* The 625K of preference files, help files, extensions, and other useless crud left behind in the System Folder by a program you no longer have installed. See also **OLEstra** (imitation productivity software).

climp (klimp), *n.* At the PowerBook end of a wrapped-up PowerBook AC adapter, the little pinching clip that clamps onto the cord to prevent it from unwrapping.

compostcards (käm' pōst kärdz), *pl. n.* The shower of subscription cards that fall out of a Mac magazine into your lap. *Syn.:* **wastecards; magazings.**

corrupgrade (kə rəp' grād), *n.* A newer version of software that you discover—after paying $99 to upgrade—is actually slower, bulkier, and less powerful than the previous version.

cybermorf (sī' bər môrf), *n.* From the gender query "M or F?"—a guy who is pretending to be female (or vice versa) in an online chat room.

doing an Apple *slang* Excelling at technology, failing at marketing. *Ant.:* **doing a Microsoft.**

far-sited *adj.* Having a particularly long and tedious Web-page URL address, especially one that requires lots of slashes, dots, and little squiggly marks.

fillyers (fil' yərz), *pl. n.* The glossy brochures, upgrade deals, CompuServe starter kits, and various assorted come-ons enclosed with a new software product or modem. See also **LANfill.**

host-age crisis (hōs' tij krī' səs), *n.* The five-minute state of online paralysis that occurs when America Online locks up with a "Sorry, the host has failed to respond" message.

hyperbolie (hī pər' bə lī), *vb.* To distort the truth regarding Apple in a popular business publication for the purpose of making a more dramatic story. *Syn.:* **ignoRant.** See also **BusinessLeak; Gall Street Journal.**

LAGS (lagz) *n.* [latest-and-greatest syndrome] Psychological distress caused by a failure to own the most powerful and expensive computer available at any given instant.

massacro (ma' si krō), *n.* A fast flurry of destructive activity the computer performs by itself, triggered by your pressing a keystroke that fires off a long-forgot-

continues on page 277

JOHN RITTER

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This Is Where...

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Jupiter from Voyager... (Vi



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What hasn't changed is Kensington's tradition of quality. Quality that has made us the first choice of both editors and users alike. *In fact, Turbo Mouse has won more awards than any Macintosh input device in history.*

How did Turbo Mouse stay number one all these years? By knowing what to change. And knowing what not to.

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